

POSTER ORAL REPRESENTATION

PO01-01

LAPAROSCOPIC HEPATECTOMY FOR HEPATOCELLULAR CARCINOMA

Kuohsin Chen, Jain-Ming Wu, Shian-dian Chen, Ying-Da Chen, Shu-Yi Huang and Kuo-Hsiang Cheng
Far-Eastern Memorial Hospital, Taiwan

Introduction: Despite its technical challenges, laparoscopic hepatectomy (LH) has been advocated more frequently. However, LH for hepatocellular carcinoma (HCC) was reported only in small cohort studies. Long term results were still unclear. In this study, we reviewed the perioperative results and long term follow-up of HCC patients receiving LH in our institute.

Method: From Feb 2002 to Jun 2013, total 355 patients received laparoscopic hepatectomy in our institute. Curative laparoscopic hepatectomy was attempted in 186 HCC patients. Fifteen patients needed open conversion. Patients with combined local ablation treatment, incomplete follow-up data and concurrent other malignancies were excluded. Total 130 patients were enrolled in this retrospective review. Operative parameters, perioperative results, and follow-up data were assessed.

Results: There were 98 male and 32 female aged from 37 to 86 y/o (mean 55.8).

Surgical procedures included wedge resection in 38 patients, 1 ~ 3 segments in 52, more than three segments in 11, left lateral sectionectomy in 11, left hepatectomy in 4 and right hepatectomy in 18. Surgical approaches included pure laparoscopic in 77 patients, hand assisted in two, hybrid in 38 and robotic in 13. Tumor location included S1 in 6 patients, S23 in 17, S4 in 13, S5 in 21, S6 in 31, S7 in 19 and S8 in 22. Margin free resection was achieved in all patients. Mean postoperative hospital stay was 7.6 days (3 ~ 46). Complications developed in 35 patients (27%) and 1 patient died of liver failure. Disease free survival and overall survival at 1, 3, and 5 years were 86%, 65%, 57% and 96%, 83% and 78%.

Conclusions: Laparoscopic hepatectomy is feasible with acceptable perioperative results. The follow-up survival data was comparable to that after open hepatectomy. However, large randomized control studies are still needed to confirm the potential benefits.

PO01-02

LAPAROSCOPIC ANATOMICAL HEPATIC RESECTION WITH GLISSONIAN PEDICLE TRANSECTION

Yuji Iimuro, Toshihiro Okada, Seikan Hai, Shogo Tanaka, Yuichi Kondo, Ikuo Nakamura, Kazuhiro Suzumura, Yasukane Asano, Tadamichi Hirano and Jiro Fujimoto
Hyogo College of Medicine, Japan

Introduction: Anatomical hepatic resection is now believed to be preferable procedure for surgical treatment of hepatocellular carcinoma (HCC), if the liver function is preserved. Recently, we have performed this procedure with Glissonian pedicle transection even in pure laparoscopic hepatectomy.

Method: HCC occupying segments 3, 4, 5, 6, 2 + 3, 6 + 7 have been good subjects for this procedure. Left or right decubitus position has been employed for the right-side or left-side segmentectomy as appropriate. Right-side segmentectomy: After cholecystectomy, Glissonian pedicles of right-paramedian and right-posterior sections are identified. For identification of more distal branches, preoperative 3-D simulation and intraoperative ultrasonography are useful. Left-side segmentectomy: Glissonian pedicle transection can be basically performed from each side of the umbilical portion. After the isolation of targeted branch, test clamp is performed and accuracy of the demarcation line is estimated comparing with preoperative simulation data. After this method, the targeted Glissonian branch is dissected using auto-staplers or clips. Parenchymal resection is performed using BiClamp and LCS or scissors. CUSA is also used as appropriate.

Results: Twenty patients underwent this procedure from Jan 2012 and August 2013. Operation time: 261 ± 119 min., Intraoperative blood loss: 121 ± 190 mL, Postoperative hospital stay: 9 ± 2 days. No morbidity or mortality was observed in this series.

Conclusions: Anatomical hepatic resection with Glissonian pedicle transection for HCC can be safely performed even in pure laparoscopic surgery. Selected patients with preserved liver function and preferable tumor site are considered to be good candidates for this procedure. Preoperative 3D-simulation and intraoperative ultrasonography are useful modalities for this method.

PO01-03

LAPAROSCOPIC ROBOT-ASSISTED MAJOR HEPATECTOMY

Fabio Caniglia, Fabio Vistoli, Stefano Signori, Francesca Costa, Mario Antonio Belluomini, Nelide De Lio and Ugo Boggi
University of Pisa, Pisa, Italy

Introduction: Major hepatectomy (MH) remains one of the last frontiers of laparoscopy because of the unique technical challenge of controlling hemorrhage from major vessels, avoiding gas embolism, limiting postoperative complications, and ensuring margin-free tumor resection. The daVinci Surgical System improves surgeon's dexterity during laparoscopic operations and could be meaningfully employed in challenging operations such as MH.

Method: Patients requiring MH were considered for possible robot-assisted surgery when there were no general contraindications to prolonged pneumoperitoneum,

American Society of Anesthesiologists classification did not exceed grade three, and liver reserve was deemed appropriate. Both symptomatic benign lesions and malignant liver tumors were accepted, when otherwise resectable, irrespective of tumor diameter but avoiding lesions extensively reaching liver capsule. Previous abdominal operations, and/or necessity for simultaneous intra-abdominal procedures were not considered absolute contraindications. Hilar cholangiocarcinoma was excluded.

Results: Between July 2010 and May 2013, 18 patients underwent robot-assisted MH. Overall there were 11 right hepatectomies, one extended right hepatectomy, three left hepatectomies, three en-bloc resection of multiple liver segments not classifiable into a classic MH. There were nine males and nine females, mean age was 63.5 years (39–80). Pathology demonstrated malignancy in 13 patients (8 CRLM, 2 HCC, 3 intrahepatic cholangiocarcinoma) and benign disease in five (four hemangioma, one solitary bile duct cyst). Three patients underwent associated procedures (right nephrectomy, enucleation of renal tumor, left colectomy). One patient was converted to open surgery (5.5%) because of difficult dissection of hilar vessels. Mean operative time (\pm SD) was 428 ± 117.2 min. Mean hospital stay was 10 ± 3.8 days. No patient required repeated surgery and none developed grade V complications, according to the Clavien scale.

Conclusions: Our experience confirms that laparoscopic robot-assisted MH is safely feasible in selected patients. The real benefits of either laparoscopy or robotic-assistance, as compared to open resection, require further experience and prospective randomized comparison.

PO01-04

PROSPECTIVE AND RANDOMIZED STUDY TO ANALYZE THE INFLAMMATORY RESPONSE OF THE LIVER RESECTION AFTER LAPAROSCOPIC AND OPEN SURGERY IN PATIENTS WITH COLORECTAL LIVER METASTASIS

Ricardo Robles¹, Beatriz Abellan², Ana Garcia¹, Asunción López Conesa¹, Roberto Brusadin¹, Carmen Botella¹, Rocio Alvarez¹, Victor López¹ and Pilar Jimeno¹

¹Virgen de la Arrixaca University Hospital, Spain;

²Reina Sofia University hospital, Murcia (Spain), Spain

Introduction: Laparoscopic surgery (LS) is less aggressive and results in a lower immune response than open surgery (OS). The patients with colorectal liver metastasis (CRLM) need adjuvant chemotherapy after liver resection, so it is important a fast recovery and lower postoperative immune response. Our objective was analyze the inflammatory response after hepatic resection in CRLM comparing LS with OS.

Method: A prospective randomized study including 40 patients was conducted: 20 patients was operated on by LS and 20 by OS. Exclusion criteria: inability to perform laparoscopic surgery, perioperative transfusion and postoperative complications. LS and OS groups

were homogeneous. In the LS group we used the hand-assisted technique (HALS) described by our Department and in the OS we used a subcostal laparotomy. We determined levels of IL-6, IL-10 and TNF-alpha at three moments: time 0 (the day before surgery), time 1 (day 3 after surgery) and time 2 (day 30 after surgery).

Results: In LS group preoperative levels of IL-6 was 10.88 ± 10.8 , increasing at third postoperative day (33.30 ± 23.45) ($p < 0.001$), and returning to normal level a month after surgery (13.33 ± 12.26). In the OS group preoperative levels of IL-6 was 8.87 ± 9.41 , increasing at the third postoperative day (35.05 ± 40.26) ($p < 0.013$), and returning to normal level a month after surgery (11.17 ± 12.04). There was no significant difference regarding IL-10 and TNF-alpha levels at any time in both group. We found no differences comparing the LS and OS groups respect to IL-6, IL-10 and TNF-alpha.

Conclusions: There are no difference between the inflammatory response that occurs after hepatic resection CRLM, comparing OS with the LS by HALS.

PO01-05

OPEN LIVER RESECTION FOR COLORECTAL METASTASES INDUCED A SIGNIFICANT INCREASE IN INTERLEUKIN-6 AS COMPARED TO LAPAROSCOPIC TECHNIQUE

Aasmund Avdem Fretland¹, Andrey Sokolov¹, Nadya Postrikanova¹, Airazat M. Kazaryan², Bård I. Røsok¹, Bjørn A Bjørnbeth¹, Tom E Mollnes¹ and Bjørn Edwin¹

¹Oslo University Hospital, Norway; ²Telemark Hospital Trust, Norway

Introduction: The Oslo CoMet-study is an open, randomized, controlled trial comparing open and laparoscopic resection for colorectal liver metastases (CRLM). The primary end point is complication rate. The aim of this sub-study was to explore differences in activation of the cytokine network, as judged by Interleukin-6 (IL-6), between the two techniques.

Method: The first 45 patients in the trial were included in the sub-study. All patients were operated with local resection of one or more CRLM, liver parenchyma was mostly divided using LigaSure®, assisted by the SonoSurg Aspirator® or Endo-GIA®. Blood samples were obtained preoperatively, after anesthesia, at set time points during surgery and 2, 6 and 24 hours after surgery. EDTA-plasma was snap-frozen at -80°C and analysed for IL-6 using luminex technique. Two patients, one in each group, had to be excluded because of technical problems with the blood samples, while one patient withdrew from the study after randomization.

Results: In the open group, IL-6 increased significantly from 27.7 pg/mL from time point before operation, to a maximum of 72.0 pg/mL at the end of surgery and declined to 42 pg/mL 24 hours postoperatively ($n = 21$). In contrast, IL-6 remained stable from start of operation (24.5 pg/mL) during the observation period with a slight increase to 27 pg/mL at the end of surgery in the laparoscopic group ($n = 21$). The differ-

ence between the groups at the end of surgery was statistically significant ($p = 0.004$).

Conclusions: These data indicate that open liver resection for CRLM induces a more pronounced inflammatory response than the laparoscopic technique.

PO02-01

TRIPLE POSITIVE TUMOR MARKERS OF EARLY STAGE HEPATOCELLULAR CARCINOMA IS A PREDICTOR OF MICROSCOPIC VASCULAR INVASION AND SATELLITE NODULES

Masaki Ueno, Masaji Tani, Manabu Kawai, Shinya Hayami, Seiko Hirono, Kennichi Okada, Atsushi Shimizu, Yoshinobu Shigekawa and Hiroki Yamaue
Wakayama Medical University, Japan

Introduction: Microscopic vascular invasion (MVI) or microscopic satellite nodules (MSN) around an early-stage hepatocellular carcinoma (HCC) nodule have been revealed to be a prognostic factor. Therefore, predicting MVI or MSN has become the next concern. Recent development of imaging diagnosis could depict tumor in detail and made it possible to predict MVI or MSN. Also measuring tumor markers such as alpha-fetoprotein (AFP), lens culinaris agglutinin-reactive fraction of AFP (AFP-L3) and des-gamma-carboxy prothrombin (DCP) were revealed to be useful for predicting tumor malignancy. In current study we aimed to investigate the most valuable predictor for MVI or MSN under the situation that the surveyed population was limited to HCC with 5 cm or smaller single nodule and without major vessel invasion.

Method: In this study 140 patients were retrospectively analyzed. Data of serum AFP, AFP-L3, and DCP levels, tumor size, and tumor margin pattern were gathered and analyzed using univariate and multivariate logistic analyses to extract MVI or MSN predictors.

Results: In univariate analysis, each tumor marker and tumor margin pattern were recognized as potent predictors. Areas under the receiver operating characteristics curve of AFP, AFP-L3, and DCP were 0.67, 0.61, and 0.69, respectively and revealed not to be powerful predictors as a continuous variables. In multivariate analysis, triple positive tumor markers and tumor margin pattern were significant predictors for MVI or MSN. The odds ratio (95% confidence interval) were 14.8 (1.71–128.3) and 2.44 (1.02–5.86), respectively. The incidence of MVI or MSN was 60% among patients with both positive predictors.

Conclusions: Triple positive status of following three tumor markers; AFP, AFP-L3, and DCP were clinically most useful for predicting microscopic vascular invasion or microscopic satellite nodules. This would be helpful for selecting treatment strategy.

PO02-02

HIGH VASCULAR ENDOTHELIAL GROWTH FACTOR AND MATRIX METALLOPROTEINASE-2 PREDICT INTRAHEPATIC TUMOR RECURRENCE IN HEPATOCELLULAR CARCINOMA PATIENTS RECEIVING RADIOTHERAPY

Yang-Gun Suh, Eun-Jung Lee, Hyejung Cha, Seung-Hyun Yang and Jinsil Seong
Yonsei University College of Medicine, Korea

Introduction: Hepatocellular carcinoma (HCC) is a highly vascularized tumor, and it is known that pro-angiogenic factors such as matrix metalloproteinase (MMP)-2, MMP-9, or vascular endothelial growth factor (VEGF) involve tumor growth and metastasis. In this study, we investigated prognostic and predictive value of these pro-angiogenic factors in HCC patients receiving radiotherapy (RT).

Method: Between September 2008 and December 2009, a total of 50 patients treated with RT were prospectively enrolled. Patients' serum and urine were collected before and <1 week after RT. Serum VEGF levels were analyzed using cytokine bead assay (CBA), and urine MMP-2 and MMP-9 levels were measured by enzyme-linked immunosorbent assay (ELISA). Serum VEGF levels are normalized by the patient's platelet count to eliminate VEGF-scavenging effect of platelet. During RT, concurrent chemotherapy was given intraarterially in 32 and systemically in three patients, respectively.

Results: Tumor response was shown as complete response in 1 (2%) and partial response in 34 patients (68%). After completion of RT, serum VEGF/platelet levels were significantly increased ($p = 0.00$). Patients who experienced intrahepatic tumor recurrence outside RT field showed higher pre-RT and post-RT VEGF/platelet compared with patients who did not ($p = 0.05$), whereas patients who had intrahepatic tumor recurrence inside RT field showed significantly higher pre-RT MMP-2 ($p = 0.04$). On multivariate analyses, patients with combined low pre-RT VEGF and MMP-2 levels ($p = 0.08$).

Conclusions: In HCC patients receiving RT, preRT level of VEGF/platelet and MMP-2 can be useful to predict treatment outcome. This study also suggests necessity of anti-angiogenic therapy, since RT might increase VEGF/platelet and higher levels of VEGF/platelet and MMP-2 are associated with intrahepatic tumor recurrence.

PO02-03

THE ROLE OF SURVIVIN EXPRESSION IN HEPATOCELLULAR CARCINOMA: A CORRELATION WITH OVERALL SURVIVAL

John Contis¹, Panagis Lykoudis¹, Konstantinos Nastos¹, Konstantinos Karapanos¹, Dionysis Voros¹ and Agathi Kondi-Pafiti²

¹University of Athens Medical School, Greece;

²Aretaieion Hospital, Greece

Introduction: Survivin is a member of the inhibitors of the apoptosis (IAP) family, involved in cell division regulation and inhibition of apoptosis. Over expression of survivin has been found in many human malignancies usually accompanying more aggressive forms followed by worse outcomes. This study aimed to assess the potential prognostic role of survivin expression in hepatocellular carcinoma surgically treated and to examine whether established prognostic markers (grade, vascular invasion, fibrosis score) are confounding factors in the correlation between survivin expression and overall survival following hepatectomy for HCC.

Method: We retrospectively studied, patients with hepatocellular carcinoma treated surgically in our department. Paraffin-embedded archived tissue and histopathology slides were retrieved concerning 99 consecutive specimens with hepatocellular carcinoma. A Ventana automatic immunostain method was applied for Survivin, with appropriate positive and negative controls. Patients were stratified according to presence of positive surviving stain and a Kaplan-Meier analysis was conducted. A Cox regression analysis was applied including variables of sex, age, positive resection margin, tumor grade, F score, vascular invasion existence of virus hepatitis, postoperative complications, tumor multicentricity (satellite nodules), and extent of resection to control for known dismal prognostic factors.

Results: A positive surviving immunostain was observed in 78 specimens. Survivin correlated with grade ($p = 0.008$). According to a Cox regression analysis, the covariates that had a statistically significant relation to survival were the existence of positive survivin stain, positive resection margins and the extent of hepatectomy. Survivin expression was found to be independently a prognostic factor of overall survival by the log rank test ($p < 0.05$).

Conclusions: Survivin expression is a prognostic factor of overall survival in hepatocellular carcinomas treated by surgical resection and its significance is independent of expression of established prognostic factors.

PO02-04

DOWN-EXPRESSION OF HERPESVIRUS ENTRY MEDIATOR IN HEPATOCELLULAR CARCINOMA IS ASSOCIATED WITH WORSE SURGICAL OUTCOMES

Jun Li, Ying Hou, Yong Xia, Dong Wu, Kui Wang, Lehua Shi, Meng-Chao Wu and Feng Shen
Eastern Hepatobiliary Surgery Hospital, Second Military Medical University, Shanghai, China

Introduction: Costimulatory molecule herpesvirus entry mediator (HVEM) is important to regulation of immune microenvironment. However, its prognostic role and possible mechanisms in human solid tumor has not been reported. The purpose of this study was to investigate the relationship between HVEM expression and prognosis of patients with hepatocellular carcinoma (HCC) following hepatectomy.

Method: A primary and validation cohorts of patients who underwent curative hepatectomy for HCC at the Eastern Hepatobiliary Surgery Hospital from 2002 to

2005 and at the First Affiliated Hospital of Fujian Medical University from September 2001 to March 2009 were studied. HCC and matched peritumoral liver tissues were semiquantitatively analyzed for HVEM expression, followed by correlation with clinicopathological parameters (patient outcomes). Moreover, the regulation of tumor immunity by HVEM from the aspect of the activation of cytotoxic lymphocyte (CTL) and natural killer cell (NK) was explored by immunofluorescent staining and cytotoxic effect assay.

Results: Low expression of HVEM in HCC tissue but not in peritumoral tissue was associated with poorer overall survival (OS) and time to recurrence (TTR), which was further reconfirmed in validation cohort. Multivariate analysis demonstrated the expression level of HVEM is an independent risk factor for both DFS and OS rate (hazard ration, HR = 0.097 for recurrence, $p = 0.002$; HR = 0.131 for survival, $p = 0.009$). Notably, HVEM low expression contributed to the low level of MHC-ABC and CTL activity in tumor tissue and human hepatoma cell lines. Moreover, down-regulation of NK-mediated tumor immunity attributed to the low level of HVEM in vitro and in vivo.

Conclusions: HVEM low expression in HCC is strongly correlated with worse surgical outcome, which may resulted from down-regulation of tumor immunity mediated by CTL and NK cells. This molecule may be a potential intervention target.

PO02-05

IMPACT OF EGF SINGLE-NUCLEOTIDE POLYMORPHISM AND RECEPTOR EXPRESSION ON RECURRENCE OF HEPATOCELLULAR CARCINOMA AFTER HEPATECTOMY

Shohei Yoshiya, Ken Shirabe, Tomohiro Iguchi, Mizuki Ninomiya, Yo-ichi Yamashita, Toru Ikegami, Shinji Okano, Tomoharu Yoshizumi, Hirofumi Kawanaka and Yoshihiko Maehara
Kyushu University, Japan

Introduction: Epidermal growth factor (EGF) gene single-nucleotide polymorphism (SNP) is associated with an increased risk of hepatic tumors. This study aimed to elucidate the impact of EGF SNP and EGF receptor (EGFR) expression on the recurrence of hepatocellular carcinoma (HCC) after hepatectomy.

Method: We retrospectively analyzed 141 HCC patients with chronic hepatitis C virus infection who underwent curative hepatectomy.

Results: The EGF *61 GG allele was present in 69 patients (48.9%), AG in 56 (39.7%), and AA in 16 (11.4%). The AA group had a significantly lower rate of intrahepatic metastasis (0% vs. 16.5%, $p = 0.02$), lower serum EGF concentration (26.3 ± 15.9 pg/ml vs. 43.4 ± 30.5 pg/ml, $p = 0.02$), and lower proportion of multiple and extrahepatic recurrence (0% vs. 43.9%, $p = 0.006$) than the AG/GG group. The AA group had a significantly higher recurrence-free survival (RFS) than the AG/GG group ($p = 0.04$), but there was no significant difference in overall survival (OS) between these two groups ($p = 0.97$). High versus low EGFR expression in cancer cells was not significantly associ-

ated with OS ($p = 0.37$) or RFS ($p = 0.39$). There was no significant association between EGFR expression and EGF genotype ($p = 0.46$) or serum EGF concentration ($p = 0.87$).

Conclusions: EGF *61 AA was associated with a lower risk of recurrence after curative hepatectomy for HCC in patients with hepatitis C virus infection than other genotypes, but EGFR expression in cancer cells was not significantly associated with prognosis.

PO03-01

NEGATIVE IMPACT OF FRESH FROZEN PLASMA TRANSFUSION ON PROGNOSIS OF PANCREATIC DUCTAL ADENOCARCINOMA AFTER PANCREATIC RESECTION

Hiroaki Shiba, Takeyuki Misawa, Yuki Fujiwara, Yasuro Futagawa, Tomonori Iida, Kenei Furukawa, Koichiro Haruki, Ryota Iwase, Yoshihiro Shirai and Katsuhiko Yanaga

Jikei University School of Medicine, Japan

Introduction: Excessive blood loss and blood transfusion may influence post-operative complications and prognosis of patients after pancreatic resection. We evaluated the influence of blood products use on post-operative recurrence and outcome of patients with pancreatic ductal adenocarcinoma.

Method: The subjects were 82 patients who underwent elective pancreatic resections for pancreatic ductal adenocarcinoma without distant metastasis nor other malignancies between January 2001 and December 2010. We retrospectively investigated the influence of the use of peri-operative blood products including red cell concentration, fresh frozen plasma (FFP), and albumin preparation, and clinical variables on disease-free and overall survival.

Result: In disease-free survival, serum carcinoembryonic antigen more than 10 ng/mL ($p = 0.015$), serum carbohydrate antigen 19-9 (CA19-9) more than 200 U/mL ($p = 0.0032$), R1 resection ($p = 0.005$), and FFP transfusion were independent risk factor for cancer recurrence in the Cox proportional regression model. Pancreaticoduodenectomy ($p = 0.057$) and advance tumor stage ($p = 0.083$) tended to be associated with poor disease-free survival, but not statistically significant. In overall survival, female ($p = 0.012$), advance tumor stage ($p = 0.005$), serum CA19-9 more than 200 U/mL ($p < 0.001$), and FFP transfusion ($p = 0.003$) were positively associated with poor overall survival in the Cox proportional regression model.

Conclusions: FFP transfusion is associated with poor therapeutic outcome after elective pancreatic resection for pancreatic ductal adenocarcinoma.

PO03-02

CORRELATION OF BIPHASIC CECT/ PET FUSION IMAGING AND ENDOSCOPIC ULTRASOUND IN PERIAMPULLARY MALIGNANCY WITH OPERATIVE AND HISTOPATHOLOGICAL FINDING

Sidharth Garg, Rajesh Gupta, Rajinder Singh and Deepak K. Basin

PGIMER Chandigarh, India

Introduction: A prospective ongoing study to evaluate the diagnostic accuracy, tumor staging and resectability results of Biphasic contrast enhanced Multidetector CT PET(PET/CECT) hybrid imaging and Endoscopic Ultrasound in patients of periampullary malignancy and finally correlating them with per operative findings and post operative histopathology.

Method: A total of thirty($n = 30$) patients of periampullary malignancy proven or suspected with no evidence of distant metastasis underwent biphasic CECT PET hybrid imaging and Endoscopic Ultrasound.

The patients ($n = 18$) who were found to have a resectable disease on Biphasic PET -CT scan and EUS were operated upon at an earliest available date and an operative and pathological diagnosis was made accordingly.

Results: Out of the total patients ($n = 30$), 18 ($n = 18$) were found to have a resectable disease on PET/CECT scan and Endoscopic Ultrasound. The patients found to have unresectable disease in either of the diagnostic modality ($n = 12$) were excluded from the study.

The patients with resectable disease ($n = 18$) underwent laparotomy. Intra operatively ($n = 5$) were found to have unresectable disease. Rest of the patients ($n = 13$) underwent pancreatodudenectomy.

Those who underwent resection ($n = 13$), the resected specimen was evaluated histopathologically for final correlation.

Conclusions: PET CT with intravenous contrast enhancement might have the potential of being established as a single' staging investigation in cases of periampullary malignancies but this will require further validation.

PO03-03

PHASE I/ II STUDY OF CONCURRENT CHEMORADIOOTHERAPY WITH GEMCITABINE AND S-1 FOR UNRESECTABLE LOCALLY ADVANCED PANCREATIC ADENOCARCINOMA

Tatsuya Ioka, Kazuhiro Katayama, Reiko Ashida and Ryoji Takada

Osaka Medical Center for Cancer and CVD, Japan

Introduction: Survival benefit of chemoradiotherapy for the unresectable locally advanced pancreatic cancer is not proven with Phase III study, yet.

Purpose: The primary objective of this study is to assess the efficacy and toxicity of concurrent radiotherapy with a combination of Gemcitabine (GEM) and S-1 for unresectable locally advanced pancreatic cancer.

Method: Chemotherapy-naïve patients with histologically or cytologically proven unresectable locally

advanced pancreatic adenocarcinoma were enrolled to this trial. The patients received gemcitabine intravenously over 30 min. on days 1 and 8 and S-1 orally b.i.d. from days 1 to 14. Cycles were repeated every 21 days until disease progression. Patients were scheduled to receive gemcitabine (mg/msq/week) and S-1 (mg/msq/day) at five dose levels: 600/50 (level 1), 600/60 (level 2), 800/60 (level 3), 800/70 (level 4) and 1000/70 (level 5). Radiation therapy was delivered through four fields as a total dose of 50.4 Gy in 28 fractions over 5.5 weeks, and no prophylactic nodal irradiation was given. Dose-limiting toxicity (DLT) was defined as grade 4 thrombocytopenia, grade 4 neutropenia, or grade 3 non-hematologic toxicity. Every patients were evaluated for response with RECIST criteria by a radiologist.

Results: Fifteen patients were enrolled in phase I study between 05/12 and 07/05. The maximum-tolerated dose was level 2, Gem 600 mg/ S-1 60 mg. Six patients experienced DLT (four patients with anorexia and two patients with Gr4 neutropenia). Fifteen patients were added to phase II study, and finally 21 patients treated with the recommended dose of phase I were enrolled to phase II part. Treatment was well tolerated. Response rate (RR) was 52% and 1 year survival rate was 76%.

Conclusions: The chemoradiation therapy with a combination of GEM and S-1 can be one of the most promising options for unresectable locally advanced pancreatic cancer.

PO03-04

DETECTION OF PANCREATIC CANCER BY ATR-FTIR SPECTROSCOPY

Katherine Oliver², Jorge Paulino¹, Eduardo Barroso¹, Graça Soveral³ and Peter Rich²

¹Universidade Nova de Lisboa - Hospital Curry Cabral, Portugal; ²Institute of Structural and Molecular Biology, University College, London, UK; ³Faculty of Pharmacy, University of Lisbon, Portugal

Introduction: Pancreatic cancer is the fourth most common cause of cancer deaths worldwide and has a 5 year survival rate of <5%. The high mortality rates can, in part, be attributed to diagnosis only at advanced stage. A rapid and sensitive diagnostic method, with the potential to detect presymptomatic disease, is therefore desirable. Mid-infrared (IR) spectroscopy is a sensitive analytical technique that exploits absorption of IR radiation arising from molecular vibrational properties. It can be used to study a wide range of materials including complex mixtures and biological samples, revealing subtle differences between samples or quantitative information on specific components. Attenuated total reflection (ATR) technology, in combination with Fourier Transform infrared (FTIR) spectroscopy, allows samples to be analysed rapidly and with little or no sample preparation. There is a growing literature on potential medical diagnostic applications of ATR-FTIR spectroscopy in many areas including cancer diagnostics. FTIR-spectroscopy has been used already to detect early-stage and premalignant changes in a number of cancers including cervical, lymphoid, and oesophageal. Here, it has been applied to the diagnosis of pancreatic cancer¹.

Method: Twenty eight healthy or tumorous pancreatic resections were collected during major pancreatic surgery and immediately frozen in dry ice. ATR-FTIR absorbance spectra were recorded after thawing. After spectral pre-processing and conversion into second derivative form, an initial survey was made of potential distinguishing features.

Results: Several features in the ATR-FTIR absorbance spectra provided good discrimination between the healthy and tumour samples, producing clear clustering of normal and diseased samples in 3D plots.

Conclusions: This preliminary analysis indicates that it is possible to distinguish normal pancreas tissue from tumorous tissue using IR spectroscopy, with scope for applying the method to detection of early stage disease.

References: 1. Movasaghi Z, et al: Fourier Transform Infrared (FTIR) Spectroscopy of Biological Tissues. *LAPS* 43:134-179, 2008.

PO03-05

LONG-TERM SURVIVORS AFTER PANCREATECTOMY IN PANCREATIC CANCER

Sung Hwan Lee, Chang Moo Kang, Ho Kyoung Hwang, Sung Hoon Choi and Woo Jung Lee
Yonsei University College of Medicine, Korea

Introduction: Despite of improvement of diagnostic techniques and treatment modalities for pancreatic cancer, the oncologic outcome after surgical resection has been still poor compared to other malignancies. The aim of this study is to evaluate the clinicopathologic characteristics of long-term survivors after pancreatectomy for pancreatic cancer compared with short-term survivors.

Method: Among 320 patients who were underwent pancreatectomy for pancreatic cancer from October 1990 to December 2012, thirty-five long-term survivors who survived more than 5 years after surgery and 110 short-term survivors who died within 2 years following operation were identified. The clinicopathologic features including demographics, perioperative outcomes, pathologic examination, and postoperative complications were compared between long-term and short-term survivors.

Results: There was no significant difference between two groups concerning demographics and perioperative factors including neoadjuvant and adjuvant treatment. In clinicopathologic features, TNM stage (Long-term vs. Short-term survivor; stage IA 11.8% vs. 0%, IB 8.8% vs. 2.8%, IIA 38.2% vs. 42.6%, IIB 35.3% vs. 51.9%, III 5.9% vs. 0%, IV 0% vs. 2.8%, $p < 0.001$) was significant prognostic factor and perineural invasion (26.5% vs. 43.1%, $p = 0.082$) showed marginally significant value. More frequent postoperative complication rates were observed in short-term survivors with marginally statistical significance (31.4% vs. 49.1%, $p = 0.067$). In multivariate overall survival analysis, the presence of postoperative complication showed significant higher hazard ratio (Exp(B) = 1.782, 95% CI: 1.193–2.660, $p = 0.005$).

Conclusions: Postoperative complications may influence the oncologic survival outcome of patients who underwent curative pancreatectomy for pancreatic cancer.

PO04-01

EVALUATION OF THE SENDAI AND 2012 INTERNATIONAL CONSENSUS GUIDELINES BASED ON CROSS-SECTIONAL IMAGING FINDINGS PERFORMED FOR THE INITIAL TRIAGE OF MUCINOUS CYSTIC LESIONS OF THE PANCREAS: A SINGLE INS

Brian Goh, Choon Hua Thng, Damien Tan, Albert Low, Peng-Chung Cheow, Jen-San Wong, Pierce Chow, Alexander Chung, Wai-Keong Wong and London Ooi

Singapore General Hospital, Singapore

Introduction: The Sendai Consensus Guidelines (SCG) was formulated in 2006 to guide management of mucinous cystic lesions of the pancreas (CLP) and this international consensus guidelines was updated in 2012 (ICG 2012). This study aims to evaluate and compare the clinical utility of the ICG 2012 with the SCG based on initial cross-sectional imaging findings performed in mucinous CLP.

Method: The records of 114 patients with pathologically proven mucinous CLP were retrospectively reviewed and classified according to the ICG 2012 as high risk ($HR^{ICG2012}$), worrisome ($W^{ICG2012}$), low risk ($LR^{ICG2012}$) and according to the SCG as high risk (HR^{SCG}) and low risk (LR^{SCG}).

Results: On univariate analysis; the presence of symptoms, obstructive jaundice, elevated serum CEA/CA 19-9, presence of solid component and dilated MPD ≥ 10 mm or ≥ 5 mm was associated with high grade dysplasia (HGD)/invasive carcinoma in all mucinous CLP. Increasing number of HR^{SCG} or $HR^{ICG2012}$ features was associated with a significantly increased likelihood of malignancy. The positive predictive value (PPV) of HR^{SCG} and $HR^{ICG2012}$ for HGD/invasive carcinoma was 46% and 62.5% respectively. The presence of elevated serum tumor markers improved the PPV of HR^{SCG} to 69%, $p = .011$ and $HR^{ICG2012}$ to 83%, $p = .103$. The negative predictive value of both LR^{SCG} and $LR^{ICG2012}$ was 100%.

Conclusions: Both the SCG and ICG 2012 were useful in the initial cross-sectional imaging evaluation of mucinous CLP. The ICG 2012 guidelines were superior to the SCG.

PO04-02

EXPRESSION OF SOMATOSTATIN RECEPTOR SUBTYPES IN PANCREATIC NEUROENDOCRINE TUMORS

Ki Byung Song, Song Cheol Km, Young-Joo Lee, Kwang-Min Park, Jae Hoon Lee, Jeong Su Nam, Jong Hee Yoon, Dong Joo Lee and Jung Woo Lee
Asan Medical Center, Ulsan University, Korea

Introduction: Studies on the expression of somatostatin receptor (SSTR) subtypes in pancreatic neuroendocrine tumors (PNETs) are rare. The aim of this study was to determine the expression of the SSTR subtypes via

immunohistochemistry analyses and assess the correlation between SSTR subtype expression status and prognosis.

Method: We examined 199 patients with PNET underwent surgical resection between January 1995 and December 2010 at the Asan Medical Center. For all cases, medical records, including demographic data, clinical symptoms, radiological findings, post-operative treatment outcomes, and expression of SSTR subtypes, were carefully reviewed.

Results: In total, 37 tumors (18.6%) displayed no somatostatin receptor immunoreactive staining, and 162 (81.4%) expressed more than one SSTR subtype. The most commonly expressed subtype was SSTR2 (109/199, 55.9%). Functioning PNET expressed significantly more SSTR subtypes, compared to non-functioning PNET. SSTR5 was highly expressed in WHO grade 1(Gr1) PNET relative to grade 2 or 3 (Gr2 or Gr3) PNET. The SSTR2(+) and SSTR5(+) groups had better prognosis than the SSTR2(-) ($p = 0.0436$) and SSTR5(-) groups ($p = 0.0266$), respectively.

Conclusions: The majority of PNETs expressed more than one somatostatin receptor subtype. The most commonly expressed somatostatin subtype in PNETs was SSTR2. SSTR5 was highly expressed in Gr1 and functioning PNET. The expression of SSTR 5 was related with good prognosis of PNET.

PO04-03

DEVELOPMENT OF BIOMARKERS FOR INTRADUCTAL PAPILLARY MUCINOUS NEOPLASM OF THE PANCREAS USING MULTIPLE REACTION MONITORING

Ikwon Kim¹, Jiyoung Yu¹, Mee Joo Kang¹, Junghyun Namkung², Taegyun Yun², Sangjo Han², Wooil Kwon¹, Jin-Young Jang¹, Sun Whe Kim¹ and Youngsoo Kim¹

¹*Seoul National University College of Medicine, Korea;*

²*Healthcare group, SK telecom, Korea*

Introduction: Intraductal papillary mucinous neoplasm (IPMN) of the pancreas, which was first described in the 1980s, is a cystic neoplasm of the pancreas that is being diagnosed with increasing frequency as an incidental finding on MRI or CT scans of the abdomen performed for some other indication. Two distinct variants have been described: main duct and branch duct. IPMN is a slow-growing tumor that has malignant potential. For this reason, there is an urgent need for early and predictive biomarkers for pancreatic cancer.

Method: We adopted multiple reaction monitoring (MRM) methods to perform targeted quantification of significantly changed proteins in IPMN. The target proteins were selected by microarray data and data mining from previous papers, the Oncomine database, the Metacore database and the Pathway studio database. Of the total target proteins, over 200 proteins, which were detected in preliminary MRM, were applied to individual plasma MRM. Individual plasma MRM was performed for 99 human plasma samples, which consisted of 50 controls and 49 IPMN. The 50 control plasma samples comprised 25 normal control plasma

samples (NC) and 25 chronic cholecystitis plasma samples (CC). Forty-nine IPMN plasma samples consisted of 31 benign IPMN plasma samples (bIPMN) and 18 malignant IPMN plasma samples (mIPMN). All MRM analyses were performed using triple quadrupole mass spectrometry.

Results: We compared MRM data by three means: (1) NC + CC vs. bIPMN + mIPMN; (2) NC vs. bIPMN + mIPMN; (3) bIPMN vs. mIPMN. In the three sets, candidate marker proteins showing area under curve (AUC) values >0.7, with p-values <0.05, were selected.

Conclusions: Further, a large cohort study is currently underway using MRM analysis for selected proteins identified in this study. The number of samples is approximately 1000, representing various diseases, including pancreatic cancer and other cancers.

PO04-04

PREDICTORS OF MALIGNANCY IN INTRADUCTAL PAPILLARY MUCINOUS NEOPLASM OF THE PANCREAS (IPMN) - ANALYSIS OF 310 PANCREATIC RESECTION PATIENTS AT MULTIPLE HIGH VOLUME CENTERS

Yasuhiro Shimizu¹, Hiroki Yamaue², Hiroyuki Maguchi³, Kenji Yamao¹, Seiko Hirano², Manabu Osanai³, Susumu Hijioka¹ and Akio Yanagisawa⁴

¹Aichi Cancer Center Hospital, Nagoya, Japan;

²Wakayama Medical University, Wakayama, Japan;

³Teine-Keijinkai Hospital, Sapporo, Japan; ⁴Kyoto Prefectural University of Medicine, Kyoto, Japan

Introduction: The present study was a retrospective investigation of predictors of malignancy in intraductal papillary mucinous neoplasm of the pancreas (IPMN).

Method: The study population was 310 patients with IPMN who underwent pancreatic resection at Aichi Cancer Center Hospital, Wakayama Medical University, or Teine-Keijinkai Hospital between 1996 and March 2011. The investigation of predictors of malignancy was done for 10 factors: age at time of surgery, sex, presence or absence of symptoms, serum amylase, CA19-9, CEA, tumor location, size of mural nodules (S-MN), diameter of main pancreatic duct (D-MPD), and cyst size of branch pancreatic duct (CS-BPD). Endoscopic ultrasonography (EUS) measurements were essential for S-MN, and CT measurement values were used for D-MPD and CS-BPD. In this study, a central review was conducted for pathological diagnosis and, patients were categorized as benign (IPMA and IPMB) or malignant (noninvasive and invasive IPMC). The significance of each prognostic factor was assessed by logistic regression analyses. A receiver operating characteristics (ROC) curve was used to measure the predictive accuracy of each independent predictor of malignant IPMN.

Results: Pathological diagnosis was benign IPMN in 150 cases and malignant in 160 (noninvasive carcinoma 100, invasive 60). In univariate analysis age, CA19-9, S-MN, D-MPD, and CS-BPD were significant factors. In multivariate analysis, S-MN, D-MPD, and CS-BPD were independent predictors of malignancy, and in

ROC analysis AUC for these 3 factors was 0.798, 0.643, and 0.601, respectively. With 7 mm taken as the cutoff value for S-MN, the diagnosis of malignant IPMN had sensitivity of 74.3% and specificity of 72.7%. Carcinoma without nodules was present in 15 patients (15/160 = 9.4%).

Conclusions: S-MN measured with EUS showed high predictive ability. However, about 10% of carcinoma patients did not have nodules, and the handling of the diagnosis in such cases is a problem for the future.

PO04-05

PROGNOSTIC FACTORS IN A 95 PATIENTS SERIES OF PANCREATIC NEUROENDOCRINE TUMORS WITH PANCREATIC RESECTION

Francisco Sanchez-Bueno, Gloria Torres, Maria Balsalobre, Jose Manuel Rodriguez, Antonio Bernabe, Rocio Garcia, Pedro Gil, Eduardo Ortiz and Pascual Parrilla

Hospital Clinico Universitario "Virgen de la Arrixaca" Murcia, Spain

Introduction: The aim is to show our experience with 95 patients operated on pancreatic neuroendocrine tumors (PNT) by analyzing the prognosis factors, which affect the survival.

Method: Medical records of 95 patients with pancreatic resection were retrospectively reviewed. The variables studied were: age, sex, form of presentation, (sporadic/familial tumors), functionality, type of tumor, localization, diagnostic tests (analytical/image tests), type of surgery, tumor size, multifocal tumors and recurrent rate. It has been used the new WHO classification.

Results: Forty five were males and 50 women. The average age was 46.8 years. Regarding on the presentation form, it was sporadic in 66 patients (69.8%) and 29 cases were familial neuroendocrine tumors (30.2%) in association with NEM 1 syndrome. 59% of patients suffered from non-functional tumors and 41% were functional: 20 insulinoma, 12 gastrinoma, 4 hypergastrinemia and 3 glucagonoma. The most popular surgery performed was distal pancreatectomy, followed by tumor enucleation in 19 patients. There was synchronous liver metastasis in 28 patients, all of them from the sporadic group. 10 patients needed liver transplant and metastases resection was made in 7 cases. According to WHO classification, 59 patients had a well-differentiated (43 functional and 16 non-functional), 24 with a well-differentiate carcinoma (six functional and 18 non-functional) and 12 with a poorly-differentiate carcinoma (two functional and 10 non-functional), respectively. The 5-year survival in well-differentiate tumors was 100%, regardless of the functionality. In contrast very poorly-differentiate tumors global survival is less than 5 years. Sporadic PNT used to be unifocal (p < 0.001), associating liver metastasis (p < 0.003). After an average follow-up of 84.3 months (range 4-293), disease-free and recurrent rates were 65.8% and 24% respectively.

Conclusions: In our experience, WHO classification was an independent prognostic factor in PNT survival. Sporadic tumors are usually non-functional with extra-pancreatic extension and worse prognosis.

PO05-01

IMPACT OF A TRANSFUSION FREE PROGRAM ON PATIENTS UNDERGOING PANCREATICODUODENECTOMY

Young Bae Jeon¹, Myung Jin Kim¹, Sora Park¹, Si Young Ok¹, Kyung Yul Hur¹ and Dongho Choi²

¹Soonchunhyang University College of Medicine, Korea;

²Hanyang University School of Medicine, Korea

Introduction: Despite the improvement of surgical techniques, patients undergoing pancreaticoduodenectomy (PD) often require transfusion. However, transfusion related complications and decreased blood donations in Korea encourage us to develop new strategy for PD patients. Nonetheless the advantage of transfusion free (TF) PD is recognized, study results suggesting beneficial effect of transfusion free PD are lacking. The aim of our study was to demonstrate the impact of transfusion-free program on PD patients.

Method: From December 2003 to October 2012, 70 consecutive patients with periampullary lesion underwent PD at Soonchunhyang University Hospital by one surgeon. The patients were categorized into 2 groups as follows: 39 PD patients before TF program (group 1), and 31 PD patients after TF program (group2). Patients who agreed with TF program were enrolled before the operation, and the program proceeded prospectively. Patients in TF group had perioperative blood augmentation and intraoperative acute normovolemic hemodilution. The perioperative data including general patient characteristics, postoperative complications, and the amount of blood transfusion were compared respectively.

Results: Mean age, sex ratio, co-morbidity, preoperative diagnosis, and the type of operation from clinical data showed no statistical differences among two groups. Mean preoperative hemoglobin level was 11.8 g/dl in group 1, and 11.9 g/dl in group 2 ($p = 0.710$). Mean operative time was 508.0 min. and 477 min. ($p = 0.18$), mean operative blood loss was 956 ml and 869 ml in group 1 and group 2 ($p = 0.468$), respectively. The amount of blood transfusion was significantly lower in group 2 (951 mL vs. 165 mL, $p < 0.0001$).

Conclusions: TF program has considerably decreased the amount of perioperative blood transfusion. The overall perioperative course and complication rate in TF group was not inferior, compared to other group. We suggest that TF program is safe and should be considered in PD patients.

PO05-02

EFFECTS OF THE CLOSING SPEED OF STAPLER JAWS ON BOVINE PANCREASES

Akira Chikamoto, Shinya Abe, Daisuke Hashimoto, Hidetoshi Nitta, Katsunori Imai, Hiromitsu Hayashi, Takatoshi Ishiko, Toru Beppu and Hideo Baba
Kumamoto University, Japan

Introduction: Division of the pancreatic parenchyma using a stapler is important in pancreatic surgery, especially for laparoscopic surgery. However, the procedure using a stapler has not yet been standardized. Although several reports have described the use of the stapler technique in laparoscopic DP, none has focused on the effects of staple jaw closure speed. We therefore assessed the correlation between the speed of staple jaw closure and pressure tightness after the division of bovine pancreases with a stapler.

Method: We have analyzed the effects of closing speed of a stapler jaw using five bovine pancreases in each method. In slow compression method, the stapler jaw was closed in 10 min., whereas, 5 min. in intermediate compression method, and 30 seconds in the rapid compression method. Three minutes of holding and 30 seconds of dividing times were the same.

Results: We found that rapid compression method demonstrated high-pressure tolerance compared to the other 2 groups (rapid, 126 ± 49.0 mmHg; intermediate, 55.5 ± 25.8 mmHg; slow, 45.0 ± 15.7 mmHg; $p < 0.01$), although the histological findings of the cut end were similar. The histological findings of pancreatic capsule and parenchyma after compression by staple jaw without firing were also similar.

Conclusions: Rapid compression may provide an advantage, as measured by pressure tolerance. A small series of distal pancreatectomy with stapler comparing the speed of the stapler jaw closing is required to prove the feasibility of these results after confirmation of the advantages of rapid compression method under various setting.

PO05-03

SYMPTOM CLUSTERS AFTER PANCREATODUODENECTOMY FOR PERIAMPULLARY CANCER

In Woong Han¹, Jin-Young Jang², Mee Joo Kang², Jae Woo Park², Wooil Kwon², Ye Rim Chang² and Sun-Whe Kim²

¹Dongguk University Ilsan Hospital, Korea; ²Seoul National University College of Medicine, Korea

Introduction: Pancreatoduodenectomy (PD) or pylorus-preserving pancreatoduodenectomy (PPPD) is being performed in increasing numbers for malignant diseases of periampullary region with minimal mortality. The purpose of this study is to find out and cluster the physical, emotional, and psychosomatic symptoms related cancer after PD/ PPPD, to figure out the factor affecting symptoms related cancer after PD/ PPPD.

Method: From 2007 to 2011, symptoms were analyzed in single-center with prospective manner that included 181 patients who underwent PD/PPPD for periampullary malignant diseases. Symptoms were assessed by European Organization for Research and Treatment of Cancer QLQ-C30 and PAN-26 module. Follow-up and data collection were performed preoperative, 'before discharge', postoperative 3, 6, and 12 months.

Results: Mean age of patients was 61.5 years. The type of operation included PD (20/ 181, 11.0%) and PPPD (161/ 181, 89.0%). There were 4 distinct symptom clusters consisted of 'Pain-related', 'Gastrointestinal (GI) function-related', 'Hepatic', and 'Pancreas exocrine

function-related symptoms' (The Cronbach α 0.752, 0.720, and 0.757, respectively). Adjuvant treatment was the risk factor of 'Pain-related symptoms (50/ 71, 70.4% vs. 60/ 110, 54.5%, $p = 0.042$)' and 'GI function-related symptoms (48/ 66, 72.7% vs. 62/ 115, 53.9%, $p = 0.017$)'. No use of postoperative pancreas enzyme supplement (lipase 25,000 unit, amylase 22,500 unit, protease 1250 unit) was risk factor of 'Pancreas-exocrine function-related symptoms (51/ 69, 81.0% vs. 74/ 112, 66.7%, $p = 0.044$). All symptom clusters was recovered on postoperative 3 month (hepatic, $p = 0.002$; the other clusters, $p < 0.001$).

Conclusions: Most patients recovered well in aspects of postoperative symptoms after PD/PPPD for periampullary malignancy at postoperative 3 months after. However, careful follow-up and supportive management are needed in the patients with symptom-related risk factor, such as, adjuvant treatment or no use of enzyme supplement.

PO05-04

THE CORRELATION BETWEEN GRADE OF PANCREATIC FISTULA AND SHAPE OF LIQUID STORAGE AROUND PANCREATIC STUMP AFTER DISTAL PANCREATECTOMY

Ryosuke Desaki, Hiroyuki Shintchi, Kosei Maemura, Yuko Mataka, Hiroshi Kurahara, Taisaku Kuwahata, Masahiko Sakoda, Shinichi Ueno and Sonshin Takao
Kagoshima University, Japan

Introduction: One of the severe morbidity associated with distal pancreatectomy (DP) is pancreatic fistula (PF). Recently, the rate of pancreatic resection by using automatic suturing device has been increasing with the spread of laparoscopic pancreatectomy. To improve a safety to normal pancreas, we have been utilizing the auto suturing device. We determined the correlation between severity of pancreatic fistula and shape of pancreatic stump around liquid storage after DP.

Method: Subjects were 39 cases of DP by autosuture conducted between 2006 and 2013. For confirmation of the liquid storage around the pancreatic stump, we have performed CT a week after surgery. PF was defined and scored based on criteria of the International Study Group on Pancreatic Fistula. We examined the following four category, (1) the relationship between the grade of PF and amylase score in the peritoneal cavity on the first postoperative day, (2) the change of amylase, (3) the size and (4) type of peritoneal cavity.

Results: The incidence of PF in all patients were Grade A: 16 cases (41%), Grade B: 4 cases (10%), Grade C: 0 (0%). We observed fluid collection around pancreatic stump in 30 cases (77%). The average length of liquid storage was 20.0 mm in no PF, 39.5 mm in Grade A and 84.0 mm in Grade B. The difference between the grade of PF and the size of liquid size was observed significantly ($p = 0.0063$). According to the shape in the fluid accumulation, they was classified in two types, localized type in 25 cases and diffused type in five cases. Diffuse type has tended to be observed frequently in Grade B.

Conclusions: Diffuse type and the large size of peripancreatic fluid is frequently observed in Grade B of pancreatic fistula. The cases with the spread of diffuse fluid accumulation is necessary for attention to the transition to pancreatic fistula grade B/C.

PO05-05

THE IMPACT OF LEFT GASTRIC ARTERY PRESERVING DISTAL PANCREATECTOMY WITH CELIAC AXIS EN-BLOC RESECTION ON DELAYED GASTRIC EMPTYING

Ken-ichi Okada, Hiroki Yamaue, Masaji Tani, Manabu Kawai, Seiko Hirono, Motoki Miyazawa, Atsushi Shimizu and Yuji Kitahata
Wakayama Medical University, Japan

Introduction: The incidence of delayed gastric emptying (DGE) is high in patients undergoing distal pancreatectomy with celiac axis en-bloc resection (DP-CAR).

Method: The medical records of 37 consecutive patients who underwent DP-CAR, including 23 (62%) left gastric artery resecting DP-CAR (conventional DP-CAR) and 14 (38%) left gastric artery preserving DP-CAR (modified DP-CAR), for pancreatic carcinoma were evaluated about the incidence of DGE based on the severity classification of the International Study Group of Pancreatic Surgery (ISGPS) retrospectively. The patients with tumors situated more than 10 mm away from antecedent branching left gastric artery underwent modified DP-CAR.

Results: Among the patients who underwent conventional DP-CAR, there were nine patients with Stage IIA, 10 with Stage IIB, three with Stage III, and one with Stage IV pancreatic carcinoma; among the patients undergoing modified DP-CAR, five patients were Stage IIA, eight with Stage IIB, and one with Stage III. The rate of antecedent branching of a left gastric artery was 51%. The shortest distance between the left gastric artery and tumor was 13 mm in patients underwent modified DP-CAR. The incidence of clinically significant DGE (Grade B/C) was low in modified DP-CAR compared to conventional DP-CAR ($p = 0.031$). ISGPS grading were: no DGE 43%, grade A = 26%, B = 13%, and C = 17% in original DP-CAR and no DGE 93%, grade A = 7% in modified DP-CAR. The R0 rate (79%) was higher in modified DP-CAR compared to that of conventional DP-CAR (43%) ($p = 0.048$).

Conclusions: Modified DP-CAR significantly reduced the incidence of DGE and with high R0 rate compared with conventional DP-CAR.

PO06-01

OXALIPLATIN ASSOCIATED LIVER LESIONS: A COMPARATIVE STUDY BETWEEN SYSTEMIC AND HEPATIC ARTERIAL ADMINISTRATION

Marc Antoine Allard¹, Mylene Sebah¹, Gaelle Baillie², Peggy Dartigues², François Faitot¹, Matthieu Faron², Dominique Elias², Rene Adam¹, Diane Goere² and Antonio Sa Cunha¹

¹Paul Brousse Hospital, France; ²Institut Gustave Roussy, France

Introduction: The presence of severe oxaliplatin-induced lesion (SOxL) in the non-tumoral liver carries important risk after hepatectomy for colorectal liver metastases (CLM). The impact of oxaliplatin administered through hepatic arterial infusion (HAI) on the NTL has not yet been studied. The aim of this study was to investigate whether oxaliplatin HAI is more often associated with SOxL.

Method: All patients (n = 135) operated on for CLMs after oxaliplatin-based regimen only, with or without targeted therapies between 2004 and 2010 in two institutions, were included. Chemotherapy was administered by either systemic (n = 116) or HAI (n = 19) route. SOxL were defined by the presence of sinusoidal obstructive syndrome (SOS) grade 2 and 3 and/or nodular regenerative hyperplasia, and were evaluated by two expert pathologists, both blinded for clinical data.

Results: The median number of cycles of oxaliplatin was higher in the HAI group compared to the systemic group, respectively 11 (3–25) and 6 (3–25). SOxL were significantly more observed in the HAI group (13 patients (68%)) compared to the systemic group (19 patients (16%), $p < 0.001$). There was a trend toward less SOxL in patients who received bevacizumab compared to those who did not (10% vs. 23%, $p = 0.08$). Among patients who received six cycles or less of oxaliplatin, the rate of SOxL was still significantly higher in the HAI group (100% vs. 13%, $p = 0.02$). A number of cycle >6 and HAI administration were both associated with SOxL on univariate analysis and on multivariate analysis, HAI administration was the sole independent predictor of SOxL [RR 9.1 (3.1–25.8)].

Conclusions: HAI of oxaliplatin seems to be associated with an increased rate of SOxL, compared to systemic administration. This could encourage to limit the number of preoperative cycles of oxaliplatin-HAI and to evaluate optimally the liver function before performing hepatectomy in these patients.

PO06-02

SIMULTANEOUS OR DELAYED LIVER SURGERY FOR SYNCHRONOUS COLORECTAL METASTASES, WHAT IS THE BEST APPROACH CONCERNING SHORT AND LONG-TERM OUTCOME?

Alejandro Serrablo, Vicente Borrego, Carlos Hörndler, Vicente Alonso-Orduña and Luis Ligorred
Miguel Servet University Hospital, Spain

Introduction: The optimal surgical strategy for patients with synchronous colorectal liver metastases (SCLM) is still unclear. The aim of this study was to compare simultaneous colorectal and hepatic resection with a delayed strategy focused on short- and long-term outcomes in a single- tertiary-institution cohort as well as in highly comparable case-matched subgroups

Method: Prospective-data from 400 patients (467 liver resections) for synchronous-metachronous CLM from 2004 were reviewed retrospectively, managed by a multidisciplinary team in a tertiary hospital. Data were coded: sociodemographics, CRC-primary, diagnosis-

surgical-treatment LM, extrahepatic-disease (EHD) and follow-up. Categorical variables were compared by χ^2 -test, continuous by independent-samples-T-test. Overall (OS)/disease-free-survival (DFS) at 1–3–5 years after first hepatectomy were calculated by Kaplan–Meier method and compared by logrank test. Separate analyses were performed for the total-study-population and for the case-matched-subgroups. Univariate and multivariate-Cox-regression-model analysis were performed to identify factors significantly related short- (90 - days-postoperative-morbimortality-Clavien-Dindo classification) and long-term outcomes (OS-DFS) in both subgroups. SPSS™ 15.0, p -value < 0.05 .

Results: Of 200 patients undergoing hepatectomy for SCLMs, 33 (16.5%) had a simultaneous colorectal resection and 152 (76%) had delayed hepatectomy. Mortality rate following hepatectomy was similar in two-groups (0 vs. 2.6% respectively; $p = 0.157$); cumulative morbidity was similar in both groups but complications-grades 3–4 Clavien-Dindo-classification was significantly higher in the simultaneous group (25.4% vs. 11% in the delayed group; $p = 0.025$). Five-year OS and DFS rates were 47 and 28% respectively in the simultaneous group, compared with 50.3 and 26.1% in the delayed group (overall survival: $p = 0.871$; progression-free survival: $p = 0.225$). A simultaneous strategy was not an independent predictor of survival neither recurrence.

Conclusions: Results of this study suggest that simultaneous colorectal-liver resection can be safely performed at the same time in selected-patients with synchronous metastases with similar short- and long-term results that delayed strategy. The benefit of addition major liver-resections and rectal cancer by this approach is still controversial.

PO06-03

IS PREHEPATECTOMY CHEMOTHERAPY NECESSARY FOR INITIALLY RESECTABLE COLORECTAL LIVER METASTASIS?

Daisuke Kudo, Hajime Morohashi, Yoshikazu Toyoki, Akihiko Murata, Motoi Koyama, Keinosuke Ishido, Yoshiyuki Sakamoto, Norihisa Kimura and Kenichi Hakamada

Hirotsuki University Graduate School of Medicine, Japan

Introduction: Hepatectomy is the only way to provide curability for patients with colorectal liver metastasis. It is unclear whether prehepatectomy chemotherapy is necessary for resectable liver metastasis, or not.

Method: We studied about 115 patients received hepatectomy for colorectal liver metastases from 2005 to 2012.

Results: Ninety two of them had prehepatectomy chemotherapy, and five year overall survival rate was 50.5%. Interestingly, that of Patients obtained 'Complete or Partial response' in CT image by RECIST criteria was 66.0%, on the other hand that of 'Stable or Progressive disease' was 38.9% ($p < 0.05$). In the whole patients, number of tumors (less than three) and the maximum diameter (less than 25 mm) showed preferable prognosis, but synchronicity, existence of extrahepatic disease (all of cases were lung), systematic

hepatectomy and postoperative complication did not affect the survival. We also studied histopathological non-tumoral liver injury about sinusoidal obstruction and steatohepatitis. Sinusoidal obstruction was assessed according to the Rubbia-Brandt criteria and equally or more than score 2 was considered as sinusoidal obstruction syndrome. Steatohepatitis was examined by NAFLD activity score, and that of more than two was considered as steatosis. In 92 patients, sinusoidal dilation was observed in 27.5% and 38.0% of them had steatosis/steatohepatitis. Liver injuries did not affect the postoperative mortality and overall survive. Regimen including oxaliplatin occurred sinusoidal obstruction (55.0%, $p < 0.05$), and bevacitumab decreased the liver injury. Patients with obesity (BMI > 25) had higher rate of steatosis (65%, $p < 0.05$).

Conclusions: In conclusion, patients had PR or CR response by prehepatectomy chemotherapy will be 'long survivor', preoperative image assessment should be more frequent and never miss the best timing for hepatectomy.

PO06-04

UNRESECTABLE COLORECTAL LIVER METASTASES: THE SAFETY AND EFFICACY OF CONVERSION THERAPY USING HEPATIC ARTERIAL INFUSION IMMUNOCHEMOTHERAPY WITH 5-FLUOROURACIL AND POLYETHYLENE GLYCOL-INTERFERON α -2A

Takuya Nakai, Yasuyuki Nakata, Keiko Kamei, Hajime Ishikawa and Yoshifumi Takeyama
Kinki University, Japan

Introduction: Hepatic arterial infusion (HAI) or systemic chemotherapy has been used to treat unresectable colorectal liver metastases. The prognosis of the disease in recent years has been improved because chemotherapy is performed prior to hepatectomy to reduce tumor size (conversion therapy). The aim of this study was to investigate the safety and efficacy of conversion therapy following HAI immunochemotherapy.

Method: Hepatic arterial infusion of 5-fluorouracil (5-FU)/polyethylene glycol (PEG)-IFN α -2a was performed in 21 patients. The primary endpoint was the safety of HAI and hepatectomy. The secondary endpoints were response rate, rate of conversion to hepatectomy, survival rate, and prognostic factors.

Results: With regard to side effects, drugs were discontinued temporarily in one patient because of a decrease in white blood cell count; however, other patients continued chemotherapy. The response rate with HAI was 61.9%, and the conversion rate was 38.1%. Hepatectomy was completed successfully without mortality. Median progression-free survival was 11.5 months (with and without conversion, 16.7 and 4.8 months, respectively; $p = 0.021$). Median overall survival was 34.6 months (with and without conversion, 48.4 and 26.6 months, respectively; $p = 0.003$). Prognosis was poor when the number of metastatic tumors was ≥ 10 (PFS: HR 32.21, $p = 0.003$; OS: HR 9.13, $p = 0.07$), but prognosis improved after hepatectomy (OS: HR 0.08, $p = 0.09$).

Conclusions: HAI immunochemotherapy with 5-FU/PEG-IFN α -2a was performed safely without major side effects. Prognosis is expected to improve after successful conversion to hepatectomy.

PO06-05

LAPAROSCOPIC LIVER RESECTION COMPARED TO OPEN APPROACH IN PATIENTS WITH COLORECTAL LIVER METASTASES IMPROVES FURTHER RESECTABILITY: ONCOLOGICAL OUTCOMES OF A CASE-CONTROL MATCHED-PAIRS ANALYSIS

Roberto Montalti¹, Giammauro Berardi¹, Stéphanie Laurent², Liesbeth Ferdinande³, Louis J. Libbrecht³, Peter Smeets⁴, Xavier Rogiers¹, Bernard De Hemptinne¹, Karen Geboes² and Roberto I. Troisi¹
¹Hepato-Biliary Surgery, Liver Transplantation Service, Belgium; ²Oncology, Belgium; ³Pathology, Belgium; ⁴Radiology, Belgium

Introduction: Liver resection is considered the standard treatment of colorectal metastases (CRLM). However, to date, no long term oncological results and data regarding repeat hepatectomy after laparoscopic approach are known.

Method: A total of 57 open resections (OR) were matched with 57 laparoscopic resections (LR) for CRLM. Matching was based mainly on number of metastases, tumor size, segmental position of lesions, type of hepatectomy and type of resection.

Results: Morbidity rate was significantly less in the LR group ($p = 0.002$); the length of hospital stay was 6.5 ± 5 days for the LR group and 9.2 ± 4 days for the OR group ($p = 0.005$). After a median follow up of 53.7 months for the OR group and 40.9 months for the LR group, the 5-year overall survival rate was 65% and 60% respectively ($p = 0.36$) and the 5-year disease free survival rate was 38% and 29% respectively ($p = 0.24$). More patients in the LR group received a third hepatectomy for CRLM relapse than in the OR group (80% vs. 14.3% respectively; $p = 0.015$).

Conclusions: Laparoscopic resection for CRLM offers advantages in terms of reduced blood loss, morbidity rate and hospital stay. It provides comparable long-term oncological outcomes but can improve further resectability in patients with recurrent disease.

PO07-01

INFLUENCE OF LIVER TRANSECTION WITH OR WITHOUT PORTAL VEIN LIGATION: COMPARATIVE STUDY IN A RAT EXPERIMENTAL SURGICAL MODEL

Rocio Garcia Perez¹, C.M. Martinez², Jezabel Fernandez², Beatriz Revilla-Nuin², Francisco Sanchez Bueno², Ricardo Robles Campos² and Pascual Parrilla Paricio²

¹Liver Surgery, Birmingham Children's Hospital Steelhouse Ln, Birmingham, United Kingdom;

²Experimental Surgery, Spain

Introduction: Actually, there is controversy about the best hepatectomy surgical method for the treatment of liver metastases for get an optimal liver regeneration in the shortest post-surgical time. Two of these methods are the portal vein ligation (PVL) and the liver transection + PVL (LTP). The aim of this study was to compare the proliferative rates and grade of liver damage of these two techniques using an experimental rat model.

Method: We used Sprague Dawley rats ($n = 75$) which were divided in three main groups: control ($n = 15$), PVL ($n = 30$) and LTP ($n = 30$). Animals were sacrificed at 1, 24 and 48 hours post-surgical procedure. Samples were collected for histopathology and histochemistry, proliferative index, and molecular biology. Additionally, samples of blood were also collected for biochemical and clotting.

Results: At 24 and 48 hours a massive hepatocyte necrosis was observed in the right side of the liver. On the left side, signs of hepatocyte proliferation (mitotic index) was observed, with a maximum rate at 48 hours in the LTP group. No histochemical alterations were observed in any group at the end of the experience. Proliferative index increased gradually, with a maximum rate at 48 hours in the LT group. Significant increase of expression of EGFR, NFK- β 1, STAT3, TGF- β , TNF- α , HGF, HIF1 α and VHL genes was observed at 1 and 48 hours, specially increased in the LTP group. GOT, GPT and bilirubin levels were dramatically increased in LTP group at 24 hours PSP. These levels decreased slightly at 48 hours, but still increased in LTP group. There are no significative changes in PT and APPT at 48 hours.

Conclusions: In our experimental model, the LTP is a technique that induces higher hepatic regeneration rate than PVL, but causes more liver damage, which could be a major limiting factor for its clinical applicability.

PO07-02

TEMPORARY PORTAL VEIN EMBOLIZATION: A TOOL FOR SAFER LIVER SURGERY AND TRANSPLANTATION? FIRST RESULTS IN MICE

Andrea Vuck, Emmanuel Melloul, Dimitri A. Raptis, Rolf Graf, Pierre-Alain Clavien and Mickael Lesurtel
University Hospital Zürich, Switzerland

Introduction: Portal vein embolization (PVE) and portal vein ligation (PVL) are routinely used to induce hypertrophy of the future liver remnant before major hepatectomy. However, temporary PVE may also be of interest to hypertrophy liver segments while preserving the occluded segments, for instance in living donor liver transplantation. The aim of our study was to hypertrophy liver lobes through temporary portal embolization while minimizing injury to the occluded lobes.

Method: C57BL/6 mice ($n = 5$ /group) underwent 70% portal vein occlusion using powdered absorbable agent (temporary PVE), embospheres (permanent PVE), or ligation (PVL). Mice were sacrificed at different time points until 30 days after portal vein occlusion. Portal

vein recanalization was assessed using magnetic resonance imaging (MRI). Liver lobe volumes were determined by MRI volumetry. Serum parameters (AST, ALT, Bilirubin; Albumin) and necrosis assessment were used to compare liver injury.

Results: Complete revascularization of occluded lobes after temporary PVE occurred at day 14. Occluded liver lobes to total liver volume (TLV) ratio at day 30 decreased by $51\% \pm 17\%$ after temporary PVE and $81\% \pm 5\%$ after permanent PVE ($p < 0.001$). Non-occluded lobes to TLV ratio increased at day 30 by $190\% \pm 25\%$ after temporary PVE and $243\% \pm 15\%$ after permanent PVE ($p > 0.05$). AST and ALT serum levels were lower after temporary embolization at day 1 and 2 after occlusion. Likewise, there was less necrosis after temporary PVE.

Conclusions: Portal flow recovery after temporary PVE limits liver lobe atrophy with less tissue injury to the occluded lobes than after permanent PVE or PVL. However, liver hypertrophy of the non-occluded lobes is similar between the three groups. In a next step, we aim at investigating liver function of the occluded lobes after revascularization. Temporary PVE may serve as a tool to increase liver lobe volume without causing irreversible damage of occluded liver lobes.

PO07-03

EFFICIENT LIVER REGENERATION FOLLOWING REPEATED REVERSIBLE PORTAL VEIN EMBOLIZATION IN THE RAT

Hadrien Tranchart¹, Marcellin Koffi², Anne Dubart-Kupperschmitt², Tuan Nguyen³ and Ibrahim Dagher¹

¹Antoine Béclère Hospital, France; ²Paul Brousse Hospital-Villejuif, France; ³Hôtel Dieu Hospital-Nantes, France

Introduction: In clinical practice, a non-absorbable material is generally used for portal vein embolization (PVE), as it provides effective, permanent vascular occlusion. Our team has developed an efficient technique of reversible embolization (RPVE) using gelfoam powder in an autotransplantation model in primates. This technique induced a significant hepatocyte proliferation in the non-embolized segments and a 40% increase in the non-embolized liver volume. The aim of this study was to evaluate the effect of a repeated reversible embolization (RRPVE) on hepatocyte proliferation and the subsequent liver hypertrophy.

Method: Fifteen Wistar rats underwent RRPVE of the left and right anterior portal branches (70% of the liver volume) using gelfoam powder with a time interval of 14 days. Three control groups of 15 rats underwent respectively single RPVE, portal ligation or sham procedure. Portograms were carried out to evaluate the complete revascularization of the embolized liver. Hepatocyte proliferation was assessed by immunostaining and Ki67 index measurement. After sacrifice, liver lobes weight was measured.

Results: Complete revascularization occurred during the 14 days following RPVE. Serum AST and ALT levels increased transiently, returning to normal values 14 days after embolization. Repeated RPVE induced

more hepatocyte proliferation in the non-embolized segments compared to single RPVE (31% vs. 15%; $p < 0.0001$). Repeated RPVE induced more hepatocyte proliferation in the non-embolized segments compared to portal ligation (31% vs. 22%; $p = 0.003$). The ratio of the posterior sector (non-embolized liver to total liver weight was similar after RRPVE and portal ligation (66% and 67%, respectively; $p = 1.0$).

Conclusions: Repeated RPVE efficiently induces liver regeneration. Repeated RPVE induced more hepatocyte proliferation compared to portal ligation. Iterative use of this stimulus could allow progressive atrophy of the embolized liver and major hypertrophy of the non-embolized segments. This approach could have numerous applications in clinical practice and liver cells transplantation.

PO07-04

COLONY STIMULATING FACTOR 1 SIGNALLING REGULATES REGENERATIVE CYTOKINE EXPRESSION FOLLOWING PARTIAL HEPATECTOMY IN MICE

Ben Stutchfield¹, D. Gow², D. Hume², S. Wigmore² and S. Forbes¹

¹MRC Centre for Regenerative Medicine, United Kingdom; ²University of Edinburgh, United Kingdom

Introduction: Initial hepatocyte priming following partial hepatectomy is thought to be related to Kupffer cell cytokine production in response to gut derived LPS. We explore whether CSF1 signalling, where receptor expression is restricted to the macrophage lineage, has a role in this process.

Method: Blockade of the CSF1 receptor was achieved using the pharmacological agent GW2580 following 2/3 partial hepatectomy (PH) in C57Bl/6 mice and compared to control mice ($n = 8$ per group). Alternatively mice were treated with CSF1 or control following partial hepatectomy ($n = 8$ per group).

Results: Blockade of CSF1 receptor significantly impaired hepatic regeneration following PH (mean number of mitotic figures 0.4 versus 4.8 per per 40 \times field, $p < 0.001$) also leading to significant elevation in markers of hepatic injury (ALT 1579 IU/L versus 532 IU/L, $p < 0.001$; AST 2175 IU/L versus 947 IU/L, $p = 0.002$) at Day 2. Hepatocyte growth factor (HGF) gene expression was unchanged, although HGF receptor (MET) expression was significantly reduced ($p = 0.01$) with CSF1 receptor blockade. Proregenerative cytokine oncostatin M gene expression was also significantly reduced ($p = 0.01$) with a trend to reduction in Il6. Both TGFbeta and TGFbeta receptor gene expression were significantly reduced ($p = 0.004$, $p = 0.002$). Conversely treating mice with CSF1 following partial hepatectomy lead to an increase in oncostatin M and Il6 gene expression ($p = 0.01$, $p = 0.03$) with increased hepatocyte proliferation at Day 4 ($p < 0.001$).

Conclusions: CSF1 plays an important role in hepatocyte proliferation following partial hepatectomy through influence on hepatic cytokine expression.

PO07-05

ENDOGENOUS IL18 SUPPRESSES LIVER REGENERATION AFTER HEPATECTOMY IN MICE

Tingbo Liang, Qida Hu, Yibo Zhang, Wei Chen, Liqiang Hu, Xueli Bai and Tingbo Liang¹

Second Affiliated Hospital, Zhejiang University, China

Introduction: IL18 is recognized as an important regulator of innate and acquired immune responses. Some reported IL18 induces liver injury. However, the comprehensive role of IL18 during liver regeneration is barely studied. In this study, we explored the role of endogenous IL18 during liver regeneration using IL18 knockout mice. We also tested the effect of IL18 binding protein (IL18BP), a natural antagonist to IL18, on liver regeneration using IL18BP-expressing lentivirus in vivo.

Method: 70% hepatectomy was performed and liver samples from IL-18 knockout mice (IL-18 KO) and wild type mice (WT) were collected for evaluation of liver regeneration at 24 h, 42 h, 3d, and 7d after surgery. Recombinant lentivirus expressing mouse IL18BP (IL18BP-LV) or negative control lentivirus (control-LV) was infused into C57BL/6 mice before hepatectomy. 70% hepatectomy was performed and liver samples were collected for evaluation of liver regeneration after surgery.

Results: We found IL18 knockout enhanced the proliferation of hepatocytes as the expression of cyclinD1 and EdU labeling index were much higher in IL18KO group at 24 h and 42 h post-operatively. Further more, the liver weight/body weight ratio (LBWR) and Ki-67 proliferation index were significantly higher in IL18KO group on post-operative day 3 and 7 than in WT group. Similarly, infusion of IL18BP-LV significantly promoted liver regeneration in this model. The expression of cyclinD1, EdU labeling index, LBWR and Ki-67 proliferation index were much higher in IL18BP-LV group than those in control-LV group.

Conclusions: Endogenous IL18 inhibited liver regeneration after 70% hepatectomy in mice. IL18BP may be an effective agent to promote liver regeneration by neutralizing serum IL-18.

PO08-01

SURGICAL TREATMENT FOR HEPATIC HEMANGIOMA: WHEN AND HOW?

Xing Huang, Han Zhang, Shu-Yang Dai, Yi-Nan Shen, Shou-Xin Yuan, Tian Yang and Feng Shen

Eastern Hepatobiliary Surgery Hospital, China

Introduction: Hemangioma is the most common benign neoplasm of the liver. Consensus on the management of hepatic hemangioma, especially on surgical indication and operating method, is controversial.

Method: A systematic review was performed with all studies published from January 2000 to January 2013 using MEDLINE, Embase, the Cochrane Library and Science Citation Index Expanded (SCI-EXPANDED). All data regarding surgical indications, approaches, morbidity, mortality and follow-up were analyzed.

Results: Twenty-four studies were analyzed and a total of 977 patients with hepatic hemangioma in these studies underwent surgical treatment. Tumor size ranged from 0.2 to 46 cm. Frequently reported surgical indications include presence of symptoms, uncertain diagnosis, rapid enlargement, patient request, prophylactic surgery for giant lesions and occurrence of life-threatening complications like Kasabach-Merritt syndrome. Enucleation was adopted by 13 studies with 519 patients, while open hepatic resections, either anatomical or non-anatomical ones, were adopted by 21 studies with 458 patients. Detailed comparisons of the two approaches were conducted in only 4 studies, a meta-analysis was conducted with the result favoring enucleation in postoperative morbidity during follow-up. Overall postoperative morbidity and mortality was 14.1% and 0.2%, respectively.

Conclusions: Surgical Indication for hepatic hemangioma far from well defined by now, a worldwide consensus is mandatory. Surgical treatment, either enucleation or hepatic resection, was reserved as a safe and effective option for severe hepatic hemangioma. Minimally invasive approaches may be optimal alternatives, pending further studies and supportive evidence.

PO08-02

PATIENT REPORTED LONG-TERM OUTCOMES AFTER LAPAROSCOPIC FENESTRATION OF NONPARASITIC LIVER CYSTS

Alex Navarro, Raymond Ho, Yin Tam, Simon Bramhall, John Isaac, Ravi Marudanayagam, Darius Mirza, Paolo Muiasan, Keith Roberts and Robert Sutcliffe

University Hospital Birmingham NHS Foundation Trust, United Kingdom

Introduction: Laparoscopic fenestration (LF) of non-parasitic liver cysts provides effective short-term symptomatic relief. However, there are concerns that cyst recurrence occurs commonly after laparoscopic surgery, and the long-term durability of this procedure is not known. The aim of this study was to evaluate long-term patient related outcomes after laparoscopic liver cyst fenestration in a large single centre series.

Method: All patients who underwent LF from Jan 2000 to June 2012 were identified from a prospective database. Exclusion criteria were: conversion to open surgery, other synchronous procedures (except cholecystectomy), and inadequate follow-up (<1 year). Clinical follow-up data were obtained from medical records, and long-term patient-related outcomes were evaluated by telephone interview.

Results: 114 patients underwent LF (66 with cholecystectomy). At a median follow-up of 4.5 years (range 1–13), 52 patients were invited to participate in a telephone interview, 52 were not contactable and 10 patients had died. Consent was obtained from 46/52 patients (89%). 42/46 patients (91%) had significant improvement or complete resolution of symptoms immediately after surgery. 6 patients (13%) sought medical advice for recurrent symptoms at a median of 10 months postoperatively, including one patient who

successfully underwent further surgery after 5 years. Overall, 45 patients (98%) were satisfied with the results of surgery, and 45 patients (98%) would recommend the operation to a friend or relative.

Conclusions: Long-lasting symptomatic relief is achieved in the majority of patients after laparoscopic liver cyst fenestration performed as an isolated procedure or with cholecystectomy, and is associated with a high level of patient satisfaction. Laparoscopic fenestration is the recommended approach in patients with symptomatic nonparasitic liver cysts.

PO08-03

COMBINED THERAPY OF LIVER METASTASES FROM GASTROINTESTINAL STROMAL TUMOR (GIST)

Marcin Kotulski¹, Piotr Rutkowski², Paweł Nyckowski¹, Bogusław Najnigier¹ and Marek Krawczyk¹

¹*Medical University of Warsaw, Poland;*

²*M. Skłodowska-Curie Memorial Cancer Center and Institute of Oncology, Poland*

Introduction: The purpose of this study was to analyze the role of surgery in the management of GIST metastatic to the liver in the group of c-KIT positive GIST patients treated in two referral institutions.

Method: Between January 2002 and December 2012 we found 21 patients (14M/7F, median age 53) treated surgically due to liver metastases (LM) from GIST. In 9 cases liver metastases were found simultaneously with primary tumors, in other 12 patients LM occurred after median time of 29 months after primary tumor resection. 3 patients underwent resection of LM immediately after their detection and estimation as resectable, the other 18 patients were treated with imatinib at the dose of 400 mg daily before liver surgery.

Results: Surgical procedures consisted of nine extensive liver resections and 10 non-anatomical resections of LM, in one case only cryoablation and in one case thermoablation of LM with resection of intraperitoneal lesions was performed. All three patients undergoing surgery of LM without imatinib treatment and two patients who did not continue imatinib therapy after liver surgery recurred within 3–11 months after operation. These relapses were successfully (PR in RECIST) treated with imatinib. The other 16 patients who underwent R0/R1 resection of residual disease after PR no longer responding to imatinib treatment, continued imatinib therapy after surgery. We observe progression (PD in RECIST) in five cases. three patients died due to disease progression 46, 93 and 94 months after diagnosis. We did not observe any serious complications requiring reoperations or prolongation of hospital stay after liver surgery due to metastatic GIST.

Conclusions: Surgery in combination with imatinib treatment is feasible and may result in improved survival of patients with GIST metastatic to the liver, the optimal strategy in GIST-LM consists of imatinib therapy, considering surgery of residual disease (if radical resection is feasible) and continuation of imatinib postoperatively.

PO08-04

HEPATOBLASTOMA IN ADULT AGE: A REPORT OF 15 CASES AND REVIEW OF LITERATURE

Qiang Wu, Tianqiang Song, Wei Zhang, Ping Chen and Qiang Li

Tianjin Medical University Cancer Hospital, China

Introduction: To study the clinical features and treatment options for patients with hepatoblastoma in adults.

Method: Fifteen cases of adult hepatoblastoma, who had been treated from May 1963 to March 2011 in Tianjin Cancer Hospital, were reviewed and analyzed. 23 cases of adult hepatoblastoma reported in English literatures since 1990 were reviewed. Multiple demographic and clinicopathological parameters were reviewed retrospectively and compared between these groups.

Results: The mean ages of patients with hepatoblastoma of our hospital were 50 years ranging from 18–74 years, with the male: female ratios of 8:7. Hepatitis B virus existed in six patients (40%) and no patient had HCV infection. The average sizes of tumor were 10.8 cm (3–20 cm), AFP was ≥ 500 ng/ml in six cases and < 500 ng/ml in three cases. Pathologically hepatoblastoma consisted of two types, and epithelial type was dominating with epithelial: mixed ratio of 11:4. Median survival time was 6 months for all (range: 30 days to 240 months) and 12 months for patients whose tumor was resected. Compared with literature, patients in the current study are older with smaller tumors, more patients had HBV infection and tumor of epithelial type. Survival time were comparable.

Conclusions: Adult hepatoblastoma has features of a short course, fast progress, high malignancy, a high rate of misdiagnosis and poor prognosis. Early diagnosis, a timely radical resection and close follow-up are the key essentials that benefit survival. Adjuvant therapy such as ablation and chemotherapy also benefit survival.

PO08-05

RADICAL SURGERY FOR LIVER HYDATID CYST: SAFE OPTION IN SELECTED PATIENTS.

Hadj Omar EL Malki¹, Amine Souadka², Badr Serji², Amine Benkabbou², Raouf Mohsine², Lahcen Ifrine², Redouane Abouqal¹ and Abdelkader Belkouchi²

¹University Mohammed Vth Souissi, Rabat, Morocco, Biostatistical, clinical research and epidemiological laboratory ^{LBRC}, Medical School, Morocco; ²University Mohammed Vth Souissi, Rabat, Morocco, Medical School, Morocco

Introduction: Surgery remains the basic treatment of liver hydatid cyst (LHC). Although, conservative approaches may be easier in endemic countries, radical procedures [pericystectomy (PK) and hepatic resection (RS)] can offer better results and outcomes. The aim of this study was to evaluate, in an endemic country, the feasibility and safety of both these radical procedures by comparing their results and surgical outcomes.

Method: From 792 patients with LHC managed and treated at the surgery department 'A' at Ibn Sina University Hospital, Rabat Morocco. One Hundred forty-four patients underwent radical surgery. Univariate, multivariate and Kaplan-Meier survival analysis were used to assess postoperative morbidity, mortality and recurrences of these patients.

Results: Thirty-two patients (22.3%) had RS and 111 patients (77.7%) had PK. Mortality rate was 1.3% (n = 2) and occurred in patients with liver resections. There were no statistical differences between PK and RS group concerning overall morbidity 18.9% versus 28.1% (p = 0.26), postoperative haemorrhage 1.8% versus 3.1% (p = .535), nor specific LHC operative complications 17.1% versus 28.1% (p = .167). Recurrence rate were similar in both groups 6.3% (p = .943), median duration of follow up of was 103 months (IQR: 48; 143 months).

Conclusions: Radical surgery for LHC is safe and feasible in endemic areas. Both PK and RS ensure good results however each procedure should be performed in specific indications. Adequate selection of patients is the warranty of good outcomes.

PO09-01

COMBINATION ADJUVANT CHEMO-IMMUNOTHERAPY USING GEMCITABINE AND $\gamma\delta$ T LYMPHOCYTES FOR PANCREATIC CANCER

Taku Aoki, Kazuhiro Kakimi, Hirokazu Matsushita, Mayumi Hoshikawa, Yoshihiro Sakamoto, Yasuhiko Sugawara, Kiyoshi Hasegawa and Norihiro Kokudo
The University of Tokyo, Japan

Introduction: The surgical outcome of pancreatic cancer patients remains unsatisfactory. Gemcitabine (GEM) has been reported to improve both recurrence-free and overall survival outcomes, but our previous results showed that GEM improved the recurrence-free but not overall survival. Therefore, we have developed a combination adjuvant regimen using GEM and $\gamma\delta$ T lymphocytes. The aim of the present study was to evaluate the safety and efficacy of our regimen.

Method: The study was started in July 2008. The inclusion criteria was (1) pancreatic cancer patients receiving R0 or R1 resections, (2) PS 0–1, (3) maintained hepatic, renal, and bone-marrow function. Patients' peripheral blood mononuclear cells were stimulated with zoledronate, and harvested $\gamma\delta$ T cells were given intravenously every 2 weeks for 12 times. The primary endpoints were safety of the therapy and recurrence-free survival. During the same period, 42 patients received adjuvant GEM monotherapy.

Results: From July 2008 to December 2012, written informed consent was obtained from 57 patients. Sufficient amount of $\gamma\delta$ T cells could be obtained from 31 patients, and 29 patients received the combination therapy. The enrolled patients consisted of 16 males and 13 females, with median age of 64 years. The therapy was abandoned in 5 patients (4 for recurrence). No severe adverse event was observed. At the end of July

2013, 13 patients experienced recurrence, and 5 patients died. The median recurrence-free survival was 30 months, showing a better outcome when compared with GEM monotherapy group. Good response was observed among patients in whom $\gamma\delta$ T cells were accumulated in the peripheral blood samples during the treatment.

Conclusions: Immunotherapy using $\gamma\delta$ T cells may have additional effect to the adjuvant GEM monotherapy. Further investigation is needed to find biomarkers to select good responders and to evaluate the status of immune-suppression among patients with pancreatic cancer.

PO09-02

OUTCOME OF NEOADJUVANT CHEMORADIATION THERAPY WITH GEMCITABINE, S-1 AND EXTERNAL BEAM RADIATION FOR LOCALLY ADVANCED PANCREATIC CANCER

Koichi Taniguchi, Ryusei Matsuyama, Ryutaro Mori, Kazunori Nojiri, Takafumi Kumamoto, Kazuhisa Takeda, Michio Ueda, Hirotohi Akiyama, Kuniya Tanaka and Itaru Endo

Yokohama City University, Japan

Introduction: The aim of this study is to examine treatment results of neoadjuvant chemoradiation therapy for locally advanced pancreatic cancer.

Method: 116 patients with locally advanced pancreatic cancer between 2001 and 2012 showing invasion to the portal vein or extrapancreatic perineural invasion to the SMA, CA or CHA by preoperative imaging studies were enrolled. We have applied neoadjuvant chemoradiation therapy (NACRT group, GS therapy 2 cycles, radiation 30 Gy) as the prospective cohort study. Treatment effect, survival and adverse events of 62 patients underwent NACRT were compared with those of 54 patients without neoadjuvant therapy (NoNAC group).

Results: NACRT group showed 19% of response rates and 94% of disease control rate according to RECIST criteria. Four cases (6%) developed remote metastasis after NACRT and micrometastasis was confirmed at the time of laparotomy or staging laparoscopy in eight cases (13%). Thus, 50 cases received radical resection (resection rate: 81%). Grade 3 or 4 of adverse events were seen in 56% of neutropenia and 40% of leukopenia. Portal vein permeation (6%, $p < 0.001$), lymph node metastasis (48%, $p < 0.001$) were significantly decreased in histologic examination of NACRT group in comparison with NoNAC group, and the R0 resection rate was higher in NACRT group (NACRT group 94%: NoNAC group 49%, $p < 0.001$). Three-year cumulative survival rate (NACRT group 47%: NoNAC group 23%, $p = 0.004$) was higher in NACRT group. Total lymphocyte count was significantly decreased after neoadjuvant therapy (Pre-therapy 1591: Post-therapy 860, $p < 0.001$) and patients with low total lymphocyte count after NACRT showed lower 3 year survival rate (low lymphocyte count (>860) 32%: high lymphocyte count (<860) 79%, $p = 0.029$).

Conclusions: NACRT may improve survival of advanced pancreatic cancer with good local control and increased R0 resection rate. To enhance further survival benefit of NACRT, some measures should be considered such as nutritional supports to improve lymphocyte depletion after NACRT.

PO09-03

APPRAISAL FOR NEOADJUVANT CHEMORADIATION THERAPY IN BORDERLINE RESECTABLE PANCREATIC CANCER: SPECIAL REFERENCE TO ISOLATED VENOUS VASCULAR INVOLVEMENT

Jin Ho Lee¹ and Chang Moo Kang²

¹Yonsei University Wonju College of Medicine, Korea;

²Yonsei University College of Medicine, Korea

Introduction: The rationale for neo-adjuvant chemoradiation therapy (Neo-CRT) and the definition of borderline resectable pancreatic cancer (BRPC) are still controversial. In particular, surgical treatment of BRPC with isolated venous vascular involvement (IVVI) is debatable.

Method: From January 2000 to December 2012, 74 patients diagnosed with BRPC according to NCCN guidelines were identified, and 61 patients were found to have BRPC with IVVI. We divided all 61 patients into three groups: surgery first without Neo-CRT (Group 1); pancreatectomy following Neo-CRT (Group 2); and no operation following Neo-CRT (Group 3). Patient characteristics including oncologic outcomes were analyzed for each of the three patients groups.

Results: Thirty-three patients were female and 28 were male, with a mean age of 61.7 ± 9.5 years. Among 61 patients with BRPC with IVVI, 23 patients (37.7%) belonged to Group 1, 26 patients (42.6%) to Group 2, and 12 (19.7%) to Group 3. Pathological tumor size ($p < 0.001$), pT stage ($p = 0.004$), pTNM stage ($p = 0.007$), combined vascular resection ($p = 0.001$), completeness of adjuvant therapy ($p = 0.003$) were found to be significantly different between Group 1 and 2. In addition, disease-free survival ($p = 0.022$) and disease-specific survival ($p = 0.009$) were improved in Group 2. Interestingly, when comparing disease-specific survival, there was no statistically significant difference between Groups 1 and 3 ($p = 0.638$).

Conclusions: The clinical practice of pancreatectomy following Neo-CRT in BRPC with IVVI provided favorable oncologic outcomes. The effect of Neo-CRT in BRPC with IVVI may be multifactorial, providing (1) Proper patient selection, (2) complete adjuvant chemotherapy, and (3) potential therapeutic (down-staging) effect.

PO09-04

FACTORS AFFECTING DELAY TO CHEMOTHERAPY AFTER PANCREATICODUODENECTOMY FOR PANCREATIC ADENOCARCINOMA

Rosanna DeSouza, Patrick Casey, Kariem Elhadd, Zaria Ali, Colin Harris, Elaine Atkinson, David Chang and Daren Subar

Royal Blackburn Hospital NHS Trust, United Kingdom

Introduction: Pancreatic adenocarcinoma affects approximately 8400 people in the UK. Surgery offers the only chance of cure. At the time of presentation only 20% of patients are suitable for surgical resection. Post-operative management includes the administration of adjuvant chemotherapy which has been proven to improve patient survival. Delay to the start of chemotherapy has been demonstrated to affect survival. The aim of this study was to determine which factors cause a delay in the commencement of chemotherapy in patients who have had pancreaticoduodenectomy for pancreatic adenocarcinoma.

Method: This is a retrospective study of all the Whipple's resections undertaken between January 2006 and December 2012 for pancreatic adenocarcinoma. The primary outcome measure was time to chemotherapy. Factors assessed included age, sex, comorbidities and post-operative complications including pancreatic fistula, post-operative haemorrhage and delayed gastric emptying. Statistical significance was taken at $p < 0.05$.

Results: 143 patients underwent pancreaticoduodenectomy in the study period of which 68 (47.5%) were for pancreatic adenocarcinoma. The M:F ratio was 37:31 with a mean age of 65 years (range 39–84 years). On univariate analysis only delayed gastric emptying was found to be statistically significant ($p = 0.03$). However, due to the small sample size, factors such as pancreatic fistula and post-operative bleeds may have been under-represented and hence their importance in influencing delay to chemotherapy are inconclusive.

Conclusions: Delayed gastric emptying delays time to chemotherapy and every effort should be made to aggressively manage those causes of delayed gastric emptying which are treatable.

PO09-05

IMPROVED OVERALL SURVIVAL OF PANCREATIC HEAD ADENOCARCINOMA FOLLOWING PANCREATICODUODENECTOMY IN THE 2000S

Jaehong Jeong, Dong Wook Choi, Seong Ho Choi, Jin Seok Heo, Dong Hun Kim and Hui Song Lee
Samsung Medical Center, Sungkyunkwan University, Korea

Introduction: Although the surgical morbidity and mortality of pancreatic resection have decreased over the past decades, pancreatic cancer still has a dismal prog-

nosis. We hypothesized that survival of resected pancreas head cancer have improved recently.

Method: A total of 401 patients underwent surgical resection for pancreatic adenocarcinoma of head. Patients who underwent in 1995–2005 (Period 1) were compared with patients in 2006–2011 (Period 2).

Results: Overall 5-year survival rate of entire 401 patients was 21.4%. The 5-year survival rate of 241 patients in Period 2 was increased from 15.6% to 26.0% compared with that of 160 patients in Period 1 (Median survival 14.0 months vs. 21.0 months, $p = 0.001$ by log-rank test). Between two periods, there was no significant difference in age, sex, T stage, tumor size, R status and a level of CA 19-9. Whereas N1 disease, poorly differentiation and adjuvant therapy were significantly higher rate in Period 2 compared with those of Period 1. In Period 2, 66.7% of patients were treated by adjuvant therapy compared with 53.3% of patients in Period 1 ($p = 0.016$). And by multivariate analysis, adjuvant therapy as well as tumor size (more than 2.5 cm), tumor differentiation, and R status were revealed as independent prognostic factors. On subgroup analysis, patients with tumor size (more than 2.5 cm), N1 disease, or well to moderately differentiation had a survival improvement by adjuvant therapy.

Conclusions: The survival of pancreatic adenocarcinoma of head following surgical resection has substantially improved in the 2000s. Adjuvant therapy increases overall survival in patients who underwent surgical resection for pancreatic cancer and recently more frequent use of adjuvant therapy accounts for survival improvement in part. So, adjuvant therapy should be considered unless patients have a poor performance status, especially with N1 disease, large tumor or well to moderately differentiation.

PO10-01

MANAGEMENT OF NECROTIZING PANCREATITIS ACCORDING TO THE CLINICAL AND MORPHOLOGY MODELS

Alexey Shabunin, Andrey Lukin and Dmitriy Shikov
Moscow Pirogov's state hospital #1, Russia

Introduction: There is wide variation in conceptual and technical approaches to interventions for necrotizing pancreatitis. We try to improve the results of treatment patients with necrotizing pancreatitis using flexible approach depending on clinical and morphology models of the disease.

Method: 489 patients with necrotizing pancreatitis (2006–2012) were retrospectively analyzed.

We compared results of the CT data, intraoperative locat-dock, the results of histological examination of biopsy material of 77 cases of necrotizing pancreatitis.

Revealed their fair match.

The main criteria (providing the ability to model) characterizing pancreatic necrosis were volume and localization of pancreatic necrosis, the prevalence of extrapancreatic disease process.

Results: Four clinical and morphological models of pancreatic necrosis were created: "Model-1" - 177 patients, "Model-2" - 153, "Model-3" - 89, "Model-4" - 70.

Depending on the results of modeling used various methods of treatment of percutaneous drainage (PCD), open surgery (OS) and combined step-up approach. Specific complications in cases managed with PCD (n = 108) - 7 (6.5%), OS (n = 57) - 3 (5.3%); Combined step-up approach - 15 (8.1%) of all (n = 350) - 25 (7.1%). The greatest number of complications observed in cases with "Model 3" and "Model-4".

Mortality: "Model-1" - 4 (2.3%), "Model-2" - 18 (11.8%), "Model-3" - 25 (28.1%), "Model-4" - 22 (31.4%) of (n = 489) - 69 (14.1%).

Conclusions: Clinical management of patients with necrotizing pancreatitis is defined by the location and extent of pathological changes in retroperitoneum, depending on the amount, location of pancreatic necrosis. Modeling of pancreatic and peripancreatic necrosis allows in selection of the optimal method of surgery and reduce the incidence of complications, morbidity and mortality.

PO10-02

PANCREATIC FLUID CULTURE IN PATIENTS WITH CHRONIC PANCREATITIS: A PROSPECTIVE STUDY

Salil Parida¹, Kalayarasan Raja², Ranjit Vijayahari², Lakshmi CP³ and Biju Pottakat²

¹Senior resident, Surgical gastroenterology, JIPMER, India; ²Assistant Professor, India; ³Assistant professor, India

Introduction: Data regarding bacteriological profile of pancreatic fluid is limited in literature. Hence this study was done to analyse the bacteriological profile of pancreatic fluid

Method: Patients who underwent elective surgery (resection or drainage) for chronic pancreatitis over a period of 20 months from November 2011 were included in this study. Patients with evidence of systemic sepsis were excluded from the study. Intraoperatively 2 ml of pancreatic fluid was aspirated using a 22G syringe aseptically and sent for aerobic and anaerobic bacterial culture.

Results: Twenty two patients who underwent surgery for chronic calcific pancreatitis during the study period were included. Majority of the patients (81.9%, 18/22) had alcohol related chronic pancreatitis. Ten (45.5%, 10/22) patients had positive pancreatic fluid culture. *Escherichia coli* (80%, 8/10) was the most common organism isolated, *Klebsiella pneumonia* and *Streptococcus pneumoniae* were isolated in one patient each. Five of the 8 (62.5%) patients with positive *Escherichia coli* on culture developed superficial surgical site infection. However, there was no difference in the incidence of anastomotic leak rate between patients with positive and negative culture.

Conclusions: A large subset of patients undergoing elective surgery for chronic pancreatitis, who are clinically free of sepsis, seems to have positive cultures despite having no history of prior intervention. This study forms the basis for further large scale studies to analyze the clinical significance of positive pancreatic fluid culture.

PO10-03

REVISION SURGERY FOR OBSTRUCTIVE CHRONIC PANCREATITIS FOLLOWING PANCREATODUODENECTOMY FOR MALIGNANT INDICATIONS

Himanshu Yadav, Rajan Saxena and Jayanth Reddy
Sanjay Gandhi Postgraduate Institute of Medical Sciences, India

Introduction: Stenosis of pancreatico-enteric anastomosis following pancreatico-duodenectomy (PD) for malignant indications can induce obstructive chronic pancreatitis in the remnant gland. The literature is sparse and outside of chronic pancreatitis, no study has addressed patients who were operated primarily for malignancy. The type of revision surgery and its exact role in ameliorating symptoms has not been defined.

Method: We retrospectively analysed 650 patients undergoing pancreatico-duodenectomy between May 1989- August 2013 at our institution from a prospective database. Patients requiring management for symptoms suggestive of chronic pancreatitis in the absence of tumor recurrence on long term follow up were identified.

Results: Two patients who underwent pylorus preserving pancreaticoduodenectomy (PPPD) with pancreatico-jejunostomy (PJ) for malignant tumors in the year 1995 and 2000 respectively, presented with symptomatic PJ stenosis with abdominal pain of pancreatic origin after a mean 30 months following index surgery. Investigations (US, CECT, MRCP) revealed a dilated pancreatic duct in the residual pancreas. Steatorrhea was documented. The first patient underwent a conversion pancreaticogastrostomy, and the second a revision PJ – both had an uneventful recovery. The resected end of the pancreas showed calcification and calculi in one patient and evidence of fibrosis and changes of chronic pancreatitis on histopathological examination in both. Follow up sonography and CECT showed a 3 mm duct in both patients without any calcification. Both patients are doing well 15 and 10 years following their revision surgery – pain free and no steatorrhea.. A third patient, referred to us following classical PD with pancreatico-gastrostomy, declined a second surgery.

Conclusions: Symptomatic pancreatico-enteric stenosis is rarely reported following pancreatico-duodenectomy for malignant tumors. Revision resective surgery in such patients can be performed with excellent results in high volume pancreatic surgery centres.

PO10-04

RADIOLOGY DIAGNOSTICS OF SOLID-PSEUDOPAPILLARY PANCREATIC TUMORS AT THE STAGES OF SURGICAL TREATMENT

Yulia Stepanova, Natalya Vetsheva, Grigory Karmazanovsky, Andrey Kriger, David Gorin and Aleksander Shchegolev
A.V. Vishnevsky Institute of Surgery, Russia

Introduction: Solid-pseudopapillary pancreatic tumors (SPPT) are considered as rare and “mysterious” new growths of a pancreas. Clinical manifestations aren't specific, that's why the definition of possibilities of radiology diagnostics of SPPT is actual.

Method: Twenty six patients (15–77 years) with SPPT passed radiology inspection from 2004 to 2013. Women prevailed (92,3%). All patients were operated on with morphological verification.

Results: The patients divided into three groups.

1 group (completely solid tumors), 11 (42,3%): tumor with the wrong form, indistinct equal contours, solid unevenly lowered echodensity structure. MRI is more preferable.

2 group (combination of solid sites and hemorrhages), 9 (34,6%): tumor has a roundish form with accurate equal contours, solid non-uniform with existence of cystic inclusions structure. US, CT and MRI allow to diagnose.

3 groups (extensive hemorrhages and cystic cavities come to light), 6 (23,1%): tumor had wrong form with accurate rather equal contours more often, structure is cystic with existence of slightly expressed solid component located mainly on the peripheries. US, CT and MRI allow to diagnose.

Presurgical verification – 53,9%. The diagnosis wasn't made presurgically in 12 cases: carcinoid tumor (five cases), pancreatic cancer (six cases), pseudocyst (1 case) were suspected. Immunohistochemical research had a crucial importance in tumor verification.

The remote results are tracked from 6 to 60 months. Recurrence was revealed in one case (SPP-carcinoma). Metastases - in three (one at the same time with primary tumor, two in the remote period).

Conclusions: In tumors with the absence of cystic component and with the insignificant sizes of a tumor the diagnosis of SPPT (I group) is difficult to make. In tumors with the presence of cystic component of this or that degree of expressiveness (II and III groups) the diagnosis of SPPT is simpler to make. Radiology signs of SPPT metastases is similar to primary tumor.

PO10-05

PANCREATIC NECROSECTOMY ANALYSIS OF 78 PATIENTS

Rohit Dama, Pradeep Rabela, GV Rao and DN Reddy

Asian Institute of Gastroenterology, India

Introduction: Pancreatic necrosectomy is a surgery with high morbidity and mortality. Here we analyse our results retrospectively

Method: Data of 78 patients who underwent surgical necrosectomy between august 2004 to august 2013 were systematically analysed. Necrosectomy was by open, laparoscopic or retroperitoneal approaches. After debridement and washes, multiple tube drains for post operative irrigation were kept. Need for diversion stoma and feeding jejunostomy was decided on clinical and intraoperative findings

Results: There were 64 males & 14 female patients. Mean age was 39.8(22–65 years). Cause of pancreatic necrosis was alcohol-38, biliary-32, whereas trauma, post ercp and autoimmune pancreatitis and idiopathic-2 each

66/78 patients underwent open necrosectomy, whereas the approach was laparoscopic in three pts, retroperitoneal in six pts, and in three pts laparoscopy was converted to open necrosectomy.

36/78(46%) pts required diversion stoma .41/78(52%) patients had feeding jejunostomy

Preoperative percutaneous drainage was done in 16/78 pts(20%).

Average time of intervention was 42nd day since onset of pancreatitis (16–120 day).

Average amount of necrotic material was 52 gms. Culture and sensitivity showed growth of e.coli in 43 pts, pseudomonas in 7, klebsiella 12, whereas in 15 pts there was polymicrobial growth.

Average post op stay 21 days (11–55). Post op prolonged ventilation(>48 hrs) required in 15 patients. 8 patients required tracheostomy. 30/78(38%) patients had high drain fluid amylase beyond 45 days, out of which 20 (26%) patients required postoperative ERCP and PD stenting for the fistula to heal. New onset DM and incisional hernia was seen in 4 patients each. 9/78 (11.5%) patients had mortality.

Conclusions: Delayed Surgical pancreatic necrosectomy done after 6–7 weeks and by minimally invasive approach is less morbid. Diversion stoma and feeding jejunostomy should be done more liberally. ERCP and PD stenting may be required for prolonged pancreatic fistulae to heal.

PO11-01

GALLBLADDER CANCER WITH RIGHT HEPATIC ARTERY INVOLVEMENT: CAN THE ARTERY BE LIGATED?

Raja Kalayarasan, Amit Javed and Anil Agarwal
GB Pant Hospital & MAM College, India

Introduction: Management of gallbladder cancer (GBC) with right hepatic artery involvement(RHAI) is controversial. Some consider it as a sign of advanced unresectable disease, while others consider it as an indication for extended hepatectomy. Hepatic artery reconstruction is recommended whenever parenchyma preserving resection is performed. We report our experience of managing GBC patients with RHAI.

Method: Retrospective analysis of clinicopathological factors and surgical outcomes of GBC patients with RHAI who underwent parenchyma preserving resection (segment IVb/V), between August 2009 and September 2012.

Results: Of 187 GBC patients who underwent curative resection during the period, nine with RHAI (and uninvolvement portal vein) who underwent parenchyma preserving resection formed the study group. Abdominal pain(n = 9) was the most common symptom followed by jaundice(n = 5) & vomiting(n = 1). On preoperative cholangiography (MRCP/PTC) all with jaundice secondary to bile duct involvement (n = 5) had infrahilar block. RHAI (without reconstruction) with CBD excision was performed in all. Roof of hepatic duct confluence was preserved in six, ductoplasty (right and left ducts) was performed in two and two separate anastomosis was performed in one. Extrahepatic adjacent organ resection was performed in six (distal gastrectomy with proximal duodenectomy (3), Duodenal

sleeve resection (3), colonic sleeve resection (1)]. Two developed bile leak in the postoperative period [grade A (ISGLS) -1 and grade B -1]. All six with roof of hepatic duct confluence preserved did not have bile leak. None of them had post-operative liver failure. Median post-operative stay was 9 (7–21) days. On histopathology 7 had adenocarcinoma and 2 adenocarcinoma with R₀ resection in all. All except one had lymph node positive disease. During median follow up 18 (3–28) months 6 patients are alive without recurrence.

Conclusions: Hepatic artery ligation without reconstruction can be safely performed in GBC patients who undergo parenchyma preserving resection with bile duct excision.

PO11-02

FEWER THAN FOUR PORTS VERSUS FOUR PORTS FOR LAPAROSCOPIC CHOLECYSTECTOMY

Kurinchi Gurusamy¹, Michele Rossi², Jessica Vaughan¹ and Brian Davidson¹

¹University College London and Royal Free Hospital, United Kingdom; ²Careggi Academic and Regional Hospital of Florence, Italy

Introduction: Traditionally, laparoscopic cholecystectomy is performed using two 10 mm ports and two 5 mm ports. Reduction in the number of ports has been suggested to decrease pain and improve cosmesis. The safety and effectiveness of using fewer than four ports has not been established.

Method: A systematic review of literature was performed by searching the Cochrane Library, MEDLINE, EMBASE and Science Citation Index Expanded for randomised controlled trials reported until February 2013. Two authors independently identified trials and collected data. Risk ratio (RR) or mean difference (MD) with 95% confidence intervals (CI) was calculated based on an intention-to-treat basis using RevMan software.

Results: A total of 531 low anaesthetic risk patients undergoing elective laparoscopic cholecystectomy were randomised in six high-bias risk trials to fewer-than-four-ports or four-ports. There was no mortality in either group. There was no significant difference in serious adverse events (RR 4.24; 95% CI 0.74–24.31), quality of life (SMD 0.18; 95% CI 0.06–0.43), conversion to open cholecystectomy (RR 0.68; 95% CI 0.19–2.35), operating time (MD 2.24 min.; 95% CI 1.13–3.36), length of hospital stay (MD 0.02 days; 95% CI 0.18–0.14), day-surgery discharge (RR 0.92; 95% CI 0.70–1.22), in the time taken to return to activity (MD 0.90 days; 95% CI 5.08–3.28), or in cosmesis scores at 12 months (SMD 0.13; 95% CI 0.19–0.46) between the two groups. The time taken to return to work was shorter by two days in the fewer-than-four-ports group compared with four-port laparoscopic cholecystectomy (MD 2.00 days; 95% CI 3.31–0.69).

Conclusions: The safety profile of using fewer than four-ports is yet to be established and fewer-than-four-ports laparoscopic cholecystectomy should be reserved to well-designed randomised clinical trials.

PO11-03

IDENTIFICATION OF BILIARY EPITHELIAL STEM/PROGENITOR CELLS BY USING LGR5

Mitsuo Miyazawa, Masayasu Aikawa, Katsuya Okada, Yukihiro Watanabe, Kojun Okamoto and Isamu Koyama

Saitama Medical University International Medical Center, Japan

Introduction: Little is known about how the extrahepatic bile duct repairs or regenerates after injury. We established a model in which a bioabsorbable polymer tube was implanted in the extrahepatic bile duct with the aim of clarifying the regeneration process (Am J Transplant 2005, 1541). Histological studies using this model demonstrated that the immature bile duct epithelium was villous in morphology and had crypts, suggesting the presence of epithelial stem cells there as in other parts of the digestive tract. We sought to locate these stem cells using Lgr5 (leucine-rich-repeat-containing G-protein-coupled receptor 5), a marker for intestinal epithelial stem cells.

Method: An artificial bile duct (ABD) in tubular form made of a bioabsorbable polymer was prepared for implantation. Pigs served as ABD recipients. The common bile duct was cut around the confluence with the cystic duct, its duodenal end was ligated and its hepatic stump was anastomosed to the ABD. The remaining end of the ABD was sutured to the duodenum. Neo-bile ducts were collected for histology at various time points after implantation. Biliary stem cells stained with the marker Lgr5 were compared with c-kit positive cells in terms of location.

Results: Lgr5 positive cells were found in accessory glandular structures seven weeks after ABD implantation and in the crypts of villous structures as well as in accessory glandular structures at 12 weeks. The location was similar between Lgr5 positive and c-kit positive cells. There were a number of accessory glandular structures at seven weeks, while the neo-bile duct showed a nearly single layer of cuboidal columnar epithelium with accessory glands decreased in number, looking like the native duct at six months.

Conclusions: In this model of extrahepatic bile duct regeneration, biliary stem/progenitor cells appeared to be in accessory glands and in the crypts of villous structures of the epithelium.

PO11-04

ELEVATED EXPRESSION OF MASPIN MRNA AS A PREDICTOR OF SURVIVAL FOR STAGE II AND III GALLBLADDER CANCER

Kavita Baghel, Hasan Raza Kazmi, Saloni Raj, Abhijit Chandra and Rajeshwar Nath Srivastava
King George's Medical University, India

Introduction: Maspin expression is found to be potential prognostic factor for various malignancies but its relation with gallbladder cancer is unknown and needs to be investigated in the area of high endemicity. In present study, we investigated maspin mRNA expression in normal, gall stone disease and gallbladder can-

cer along with its prognostic importance in cancer patients.

Method: Gallbladder tissue from normal ($n = 25$), gall stone disease ($n = 25$) and cancer patients ($n = 38$) were analysed for maspin mRNA expression by semi-quantitative reverse transcriptase PCR and quantitative real time PCR. Statistical analysis was carried out using student t test or ANOVA. Survival analysis was done according to Kaplan-Meier method. Correlation analysis was performed using Pearson correlation method. $p < 0.05$ was considered statistically significant.

Results: Significant increase ($p = 0.028$) in expression of maspin mRNA was observed in gallbladder cancer as compared to gall stone disease, whereas no expression was found in normal tissues. Significant correlation (Pearson's coefficient (r) = -0.798 , $p < 0.0001$) was observed between relative quantification of maspin mRNA and survival of cancer patients after surgery, with significantly shorter ($p = 0.002$) survival in patients having relative quantification >1.5 as compared to those having relative quantification ≤ 1.5 . Similarly, significant difference in patient survival for maspin mRNA expression was observed for stage II ($p = 0.025$) and III ($p = 0.011$) cancer.

Conclusions: Higher expression of maspin mRNA in gallbladder cancer has prognostic significance for stage II and III cancer, which needs to be investigated further.

PO11-05

COMPARISON OF EMERGENCY LAPAROSCOPIC CHOLECYSTECTOMY FOR ACUTE CHOLECYSTITIS WITHIN AND BEYOND 72 H OF SYMPTOM ONSET

Nilesh Doctor¹ and Rachel Gomes²

¹Jaslok Hospital and Research Centre, India; ²NUSI Wockhardt Hospital, India

Introduction: The pathological boundary of acute cholecystitis (AC) between early edematous and late chronic fibrotic inflammation beyond 72 h is well-described. Early laparoscopic cholecystectomy (ELC) is safe in AC but the timing still remains controversial. The aim of this study was to analyze the impact of the duration of symptoms on clinical severity, pathology and outcome in patients who underwent laparoscopic cholecystectomy (LC) for AC during the urgent admission.

Method: A retrospective analysis of a prospectively collected database of 61 patients who underwent LC for AC over a 6-month period was performed.

Results: Of 61 patients 21 (34.43%) received ELC at <72 h and 40 (65.57%) received late LC (LLC) at >72 h. Clinically in the ELC group the majority were mild and in the LLC group the majority were moderate and severe in severity grading as per Tokyo guidelines ($p < 0.001$). Surgical findings and histopathology showed no significant difference in the distribution of simple, phlegmonous and gangrenous cholecystitis between both groups ($p = 0.94$). The majority were completed by a standard four port technique and only one required subtotal cholecystectomy. There was no

significant difference between operating time, return to normal activities or hospital stay between both groups. There were no conversions to open cholecystectomy, no wound infections, no intra-abdominal collections, no biliary tract injury or mortality in either group.

Conclusions: The degree of inflammatory change in AC is not dependent on time. LC can be safely performed in AC regardless of timing with a standardized surgical strategy in experienced units.

PO12-01

ASSESSMENT OF LYMPH NODE STATUS IN EXTRAHEPATIC CHOLANGIOCARCINOMA: NUMBER VERSUS RATIO OF POSITIVE LYMPH NODES

Jun Sakata, Taku Ohashi, Yuki Hirose, Tomohiro Katada, Natsuru Sudo, Kazuyasu Takizawa, Kabuto Takano, Takashi Kobayashi, Masahiro Minagawa and Toshifumi Wakai

Niigata University Graduate School of Medical and Dental Sciences, Japan

Introduction: This study aims to compare the utility of the number of positive nodes with lymph node ratio (LNR) in predicting survival after resection for extrahepatic cholangiocarcinoma.

Method: We conducted a retrospective analysis of 142 consecutive patients undergoing a radical resection for extrahepatic cholangiocarcinoma. A total of 3656 lymph nodes were retrieved (median, 24 nodes per patient). Regarding both the number of positive nodes and LNR, "optimal" cutoff values were determined based on the χ^2 scores calculated by the Cox proportional hazards regression model.

Results: Nodal disease was found in 59 (42%) patients. None of the 18 patients undergoing an R1-2 resection survived for more than 5 years, and thus these patients were excluded from subsequent analyses to assess the impact of nodal status on long-term survival. The "optimal" cutoff values for the number of positive nodes and LNR were determined to be one node and 5%, respectively. Univariate analysis identified both the number of positive nodes (0, 1, or 2 or more; $p < 0.001$) and LNR (0%, 0–5%, or $>5\%$; $p < 0.001$) as prognostic factors. Multivariate analysis identified the number of positive nodes as an independent prognostic factor ($p < 0.001$), whereas LNR failed to remain as an independent variable. The 5-year survival rates were 64% for patients with 0 positive nodes, 46% for patients with 1 positive node, and 21% for patients with two or more positive nodes ($p < 0.001$).

Conclusions: The number of positive nodes better predicts survival after resection than LNR in extrahepatic cholangiocarcinoma.

PO12-02

EVALUATION OF POSITIVE DUCTAL MARGINS OF CHOLANGIOCARCINOMA IN INTRAOPERATIVE HISTOLOGICAL EXAMINATION

Junji Ueda, Hiroshi Yoshida, Yasuhiro Mamada, Nobuhiko Taniai, Masato Yoshioka, Youichi Kawano, Tetsuya Shimizu, Daisuke Kakinuma, Hideyuki Takata and Eiji Uchida

Nippon Medical School, Japan

Introduction: Frozen-section analysis remains the only method to confirm microscopic extension of the cancer at the ductal resection margins during surgery. However, several reports have found that prognosis for patients with a positive bile duct stump does not differ significantly from that of carcinoma-negative patients, and some reports have even described long-term survival of patients with a positive surgical bile duct stump. In this study, status of the surgical margins and postoperative course were evaluated in 93 patients with extrahepatic bile duct carcinoma to elucidate the influences of remnant carcinoma in situ on postoperative survival.

Method: All consecutive patients who underwent curative intent resection for a cholangiocarcinoma at our institution between January 2004 and May 2012 were identified from a retrospectively collected database. We evaluated the postoperative survival and disease free survival. We performed immunohistochemical staining targeting Ki 67 and p53 for positive margin to evaluate the relation of these protein and prognosis.

Results: We divided these patients into two groups, margin positive group and negative group. The major vessel invasion and peeled surface margin positive cases were significantly higher in positive group than negative group. We focused on positive group and divided this group into two groups according to resected margin status: carcinoma in situ at the bile duct stump and invasive carcinoma at any surgical margin. There were no significant differences in clinicopathological findings between two groups. Recurrence and Survival were significantly longer in CIS group than Invasive group. We performed immunohistochemical staining targeting p53, Ki 67 of positive margin. There were no statistical relations between CIS, invasive group and expression of p53 and Ki 67. Moreover there were no statistical relations between the expression of p53 and Ki 67 and survival and recurrence.

Conclusions: Resected margin status is the most important to postoperative survival and recurrence in cholangiocarcinoma.

PO12-03

TECHNICAL KNACKS AND OUTCOMES OF EXTENDED EXTRAHEPATIC BILE DUCT RESECTION IN PATIENTS WITH MID BILE DUCT CANCER

Youngin Yoon, Shin Hwang, Tae-Yong Ha, Ki-Hun Kim, Chul-Soo Ahn, Deok-Bog Moon, Gi-Won Song, Dong-Hwan Jung, Gil-Choon Park and Sung-Gyu Lee
Asan Medical Center, Ulsan University, Korea

Introduction: Mid bile duct cancers often involve the proximal intrapancreatic bile duct, by which resection of the extrahepatic bile duct (EHBD) can result in tumor-positive distal resection margin (RM). We attempted a customized surgical procedure to obtain tumor-free distal RM during EHBD resection, by which R0 resection can be achieved without performing pancreaticoduodenectomy through extended EHBD resection.

Method: We previously reported the surgical procedures of extended EHBD resection, in which the extent of intrapancreatic duct excavation resembling a ≥ 2 cm-long funnel. This unique procedure was performed in 11 cases of mid bile duct cancer with old age between 70 and 83 years.

Results: The tumor extents were involvement of intrapancreatic duct in all cases. Deep pancreatic excavation per se required about 30–60 min. Cancer-free hepatic duct RM was obtained in 10 patients. Prolonged leakage of pancreatic juice occurred in 2 patients, but all were controlled with supportive care. Adjuvant therapies were primarily applied to RM-positive or lymph node-positive patients. Their 1-year and 3-year survival rates were 90.9% and 60.6%, respectively.

Conclusions: We suggest that this extended EHBD resection can be performed as a beneficial option to achieve R0 resection when pancreaticoduodenectomy should be avoided due to various causes including old age and expectation of poor outcome.

PO12-04

EARLY DNA DAMAGE RESPONSE IN RESIDUAL CARCINOMA IN SITU AT DUCTAL STUMPS AND LOCAL RECURRENCE IN PATIENTS UNDERGOING RESECTION FOR EXTRAHEPATIC CHOLANGIOCARCINOMA

Toshifumi Wakai, Jun Sakata, Yuki Hirose, Tomohiro Katada, Natsuru Sudo, Taku Ohashi, Kazuyasu Takizawa, Kabuto Takano, Takashi Kobayashi and Masahiro Minagawa

Niigata University Graduate School of Medical and Dental Sciences, Japan

Introduction: This study aimed to clarify the association between the DNA damage response mediated by p53-binding protein 1 (53BP1) in residual carcinoma *in situ* at ductal stumps and local recurrence in patients undergoing resection for extrahepatic cholangiocarcinoma.

Method: A retrospective analysis was conducted of 11 patients with positive ductal margins with carcinoma *in situ*. To evaluate the early DNA damage response, the nuclear staining pattern of 53BP1 was examined by immunofluorescence. TUNEL analysis was used to calculate the apoptotic index.

Results: Of the 11 tumor specimens of carcinoma *in situ*, seven showed diffuse localization of 53BP1 in nuclei (53BP1 inactivation) and four showed discrete nuclear foci of 53BP1 (53BP1 activation); apoptotic index was significantly decreased in the seven tumor specimens with 53BP1 inactivation compared to the four with 53BP1 activation (median apoptotic index, 1% vs. 22%; $p = 0.003$). The overall cumulative survival rates after resection were 56% at 5 years and 19% at 10 years. The cumulative probabilities of local recurrence after resection were 38% at 5 years and 67% at 10 years. The cumulative survival after resection was significantly worse in patients with 53BP1 inactivation than in patients with 53BP1 activation (cumulative 5-year survival rate, 33% vs. 100%; $p = 0.038$). The cumulative probability of local recurrence was significantly higher in patients with 53BP1 inactivation than in patients with 53BP1 activation (cumulative 5-year local recurrence rate, 60% vs. 0%; $p = 0.019$).

Conclusions: Clinically evident local recurrence of residual carcinoma *in situ* at ductal stumps is closely associated with 53BP1 inactivation and decreased apoptosis. In contrast, apoptosis associated with early 53BP1-mediated DNA damage response is one of the molecular biological mechanisms that permit a small proportion of patients with residual carcinoma *in situ* at ductal stumps to survive in the long term with no evidence of local recurrence.

PO12-05

PANCREATODUODENECTOMY FOR SECONDARY PERIAMPULLARY CANCER FOLLOWING EXTRAHEPATIC BILE DUCT CANCER RESECTION

Dong Hun Kim, Dong Wook Choi, Seong Ho Choi, Jin Seok Heo, Jaehong Jeong and Huisong Lee
Samsung Medical Center, Sungkyunkwan University, Korea

Introduction: This study addressed the feasibility and effect of surgical treatment of metachronous periampullary carcinoma after resection of the primary extrahepatic bile duct cancer. The performance of this secondary curative surgery is not well-documented.

Method: We reviewed, retrospectively, the medical records of 10 patients who underwent pancreaticoduodenectomy (PD) for secondary periampullary cancer following extrahepatic bileduct cancer resection from 1995 to 2011, at Samsung Medical Center.

Results: The mean age of the 10 patients at the second operation was 61 years (range: 45–70 years). The primary cancers were seven hilar cholangiocarcinomas, two middle common bile duct cancers, and one cystic duct cancer. The secondary cancers were eight distal common bile duct cancers and two carcinomas of the ampulla of Vater. The second operations were six Whipple procedures and four pylorus-preserving pancreaticoduodenec-

tomies. The mean interval between primary treatment and metachronous periampullary cancer was 20.6 months (range: 3.4–36.6 months). The distal resection margin after primary resection was positive for recurrent disease in one patient. Preoperative endoscopic biopsy for secondary periampullary cancer was performed and confirmed the recurrent cancer in 6 patients. Tumor recurrence was confirmed by periampullary pathology in 8 cases. Four of the 10 patients had delayed gastric emptying ($N = 2$) and pancreatic fistula ($N = 2$) after reoperation. No deaths occurred in surgery. Median survival after PD was 44.6 months (range 8.5–120.5). **Conclusions:** Based on post-operative survival, PD may provide an acceptable protocol for resection in patients with metachronous periampullary cancer after resection of the extrahepatic bile duct cancer.

PO13-01

IS THERE ANY ROLE FOR HEPATIC PEDICLE LYMPHADENECTOMY IN INTRAHEPATIC CHOLANGIOCARCINOMA? REVIEW OF A 17-YEARS EXPERIENCE IN A TERTIARY INSTITUTION

Dong Hun Kim¹, Sun Choon Song¹, Dong Wook Choi¹, Seong Ho Choi¹, Jin Seok Heo¹, Jaehong Jeong¹ and Alfred Wei-Chieh Kow²

¹Samsung Medical Center, Sungkyunkwan University, Korea; ²University Surgical Cluster, National University Health System, Singapore

Introduction: While the role of lymphadenectomy for extrahepatic cholangiocarcinoma is well established, routine lymphadenectomy in intrahepatic cholangiocarcinoma (ICC) remains controversial. In this study, we examine the prognostic factors for survival in patients with resected ICC comparing the outcome of hepatic pedicle lymph node dissection (LND).

Method: The data of 226 patients with ICC who underwent liver resection over 17 years were retrospectively collected. These patients were divided into those with LND performed [LND (+)] and those not [LND (-)].

Results: There were 120 patients (53.1%) in the LND (+) group and 106 patients (46.9%) in the LND (-) group. The demographic data were comparable between the two groups except the presentation of liver cirrhosis ($p = 0.002$), carbohydrate antigen (CA) 19-9 ($p = 0.002$), type of hepatectomy ($p < 0.001$) and adjuvant treatment ($p < 0.001$). The proportion of T stage ($p = 0.001$), tumor differentiation ($p = 0.049$), lymphovascular invasion ($p = 0.001$), perineural invasion ($p = 0.012$) and macroscopic growth type ($p = 0.001$) were significantly higher in the LND (+) group. There were no statistically significant difference between LND (+) and LND (-) groups in terms of overall survival ($p = 0.097$) and disease-free survival ($p = 0.125$). Lymph node metastasis ($p < 0.001$) and poorly differentiated histologic grade ($p = 0.016$) were identified to the independent prognostic factors of overall survival.

Conclusions: Routine LND did not show survival benefit, however, it seemed to be crucial in nodal staging and prognostication of the disease, which was essential for decision on adjuvant treatment.

PO13-02

INTRAHEPATIC CHEMOTHERAPY SHOULD BE THE ANSWER FOR UNRESECTABLE CHOLANGIOCARCINOMA: REVIEW OF THE LITERATURE AND PERSONAL EXPERIENCE

Marco Massani, Roberta Bonariol, Tommaso Stecca, Luca Fabris, Cesare Ruffolo, Luca Bonariol, Ezio Caratozzolo and Nicolò Bassi
Regional Hospital, Italy

Introduction: Cholangiocarcinoma is a tumor that arise primarily from the epithelial lining of the intra and extrahepatic bile duct. Is the second most common primary liver cancer and accounted for an estimated 15% of primary liver cancer. Prognosis of cholangiocarcinoma is generally poor. Surgery is the only curative treatment for patients with CC, however less than one-third of patients are resectable at diagnosis. Curative resection provides the best long term survival. Five years survival rates after resection are 22–44%. The aim of this study was to evaluate the efficacy of intrahepatic chemotherapy in patients with intrahepatic cholangiocarcinoma analyzing the outcome and survival and compare our results with a review of literature.

Method: From January 2008 to December 2012 we have observed 630 patients with hepatic lesion; the group of patients with proven diagnosis of intrahepatic cholangiocarcinoma consisted of 32 patients of whom 11 judged resectable at the moment of diagnosis while 21 were not resectable. Eleven patients were referred to systemic chemotherapy or best supportive care due to extra hepatic diffusion or because not resectable due to comorbidities. 11 pts were treated with intra-arterial chemotherapy and are the object of the study

Results: Four had a response of more than 50%, five had stable disease and two had clear progression. Interestingly three patients who had response to chemotherapy were resected and in two of them the percentage of necrosis, at pathological examination, were more than 90%. Two patients, in the group of stable response, developed extra-hepatic disease, while three are alive with disease. Two of the resected patients are alive while the third one died 23 months after surgery.

Conclusions: Our experience, even considering the small number of patients treated, suggests that intra-arterial chemotherapy should be considered as an efficacious arm in the treatment of intra-hepatic cholangiocarcinoma

PO13-03

SURGICAL OUTCOMES OF HILAR CHOLANGIOCARCINOMA WITH BISMUTH TYPE III OR IV: EARLY EXPERIENCES OF NEOADJUVANT CONCURRENT CHEMORADIATION THERAPY

Dai Hoon Han, Sung Hoon Choi, Gi Hong Choi, Kyung Sik Kim and Jin Sub Choi
Severance Hospital, Yonsei University, Korea

Introduction: Although aggressive surgical resection with negative resection margin (R0 resection) remains standard treatment for hilar cholangiocarcinoma (HCCA), systemic recurrence as well as local recurrence is frequent even after R0 resection. This study aimed to analyze the prognostic factors after surgical resection for Bismuth type III or IV HCCA and identify the possible role of neoadjuvant concurrent chemoradiation (CCRT) therapy.

Method: From January 2000 to May 2013, 129 consecutive patients with Bismuth type III or IV underwent surgical resection for treatment of HCCA. Among these patients, 120 patients underwent curative aimed surgical resection and 16 patients received neoadjuvant concurrent chemoradiation therapy. Disease-free and overall survivals after surgical resection were evaluated and prognostic factors were analyzed. Then, perioperative outcome of the patients with neoadjuvant CCRT was compared the patients without neoadjuvant CCRT.

Results: R0 resection was achieved in 102 patients (85.0%) and perioperative mortality was 14.2%. 5-year disease-free and overall survivals of 120 patients were 29.7 and 30.2%, respectively. Preoperative CA 19-9 more than 400 U/ml, preoperative serum total bilirubin more than 2 mg/dL, and presence of microscopically positive resection margin were worse prognostic factors for overall survival according to multivariate analysis. R0 resection was achieved for all patients with neoadjuvant CCRT even though there was no statistically significance. Recurrence rates, especially local recurrence rate after surgical resection were smaller in the patients with neoadjuvant CCRT (50.5% vs. 31.3% and 25.5% vs. 12.5%, respectively) even though there was no statistically significance.

Conclusions: Radical R0 resection was one of the independent prognostic factors for overall survival after surgical resection in patients with Bismuth type III or IV HCCA. Neoadjuvant CCRT allowed for R0 resection in all patients and tended to decrease recurrence rate and local recurrence. To confirm the effect of neoadjuvant CCRT on surgical outcomes, prospective randomized controlled trial is needed.

PO13-04

EXPRESSION PROFILE OF MICRORNA-200 FAMILY IN CHOLANGIOCARCINOMA ARISING FROM CHOLEDOCHAL CYST

Ta-Sen Yeh, Tse-Ching Chen, Chun-Nan Yeh and Yi-Yin Jan
Chang Gung Memorial Hospital, Chang Gung University, Taiwan

Introduction: Cholangiocarcinoma arising from choledochal cyst (CC-CC) is well recognized particularly in Eastern Asia. The long-term outcome of CC-CC after resection is considered worse than cholangiocarcinoma caused by other etiologies (CC). Recently, epithelial-mesenchymal transition (EMT) has been demonstrated as a critical step for carcinogenesis and metastasis, during which microRNA-200 (miR-200) family might play an important role.

Method: A total of 16 patients with CC-CC whom had undergone intended curative resection were recruited. Meanwhile a total of 254 patients with resected CC served as demographic controls; of them, 66 were arbitrarily selected for miR-200 family and EMT-affiliated molecules controls. miR-200 family including miR-200a, 200b, 200c, 141 and 429 were detected using qPCR; whereas EMT-affiliated molecules (E-cadherin, ZEB1, vimentin, Twist, Snail, p53, Bmi-1, Igfbp-4) were determined using immunohistochemistry.

Results: CC-CC were younger and female-predominant compared to CC; whereas the latter were more associated with concomitant hepatolithiasis. The expression of miR-200 family in CC-CC were significantly lower compared with those of CC ($p < 0.0001$). CC-CC exhibited more frequently overexpression of ZEB1, Twist, Snail and vimentin, and aberrant E-cadherin expression, indicating EMT. Further, CC-CC demonstrated more p53 overexpression and stemness factor Bmi1, but reduced level of metastasis-suppressive protein Igfbp4. *In vitro* functional assay demonstrated that installation of pre-miR 200s upon cholangiocarcinoma cells attenuates their biological aggressiveness; whereas installation of anti-miR 200s enhances biological aggressiveness.

Conclusions: We for the first time demonstrated that miR-200 family is responsible for the development of CC-CC via ZEB1-directed EMT activation and Sec23a-mediated secretome.

PO13-05

SUBSEQUENT BILIARY MALIGNANCY FOLLOWING CYST EXCISION FOR CONGENITAL CHOLEDOCHAL CYSTS: REPORT OF THREE CASES

Tomohiro Katada, Jun Sakata, Taku Ohashi, Yuki Hirose, Natsuru Sudo, Kazuyasu Takizawa, Kabuto Takano, Takashi Kobayashi, Masahiro Minagawa and Toshifumi Wakai

Niigata University Graduate School of Medical and Dental Sciences, Japan

Introduction: Although cyst excision is the treatment of choice for congenital choledochal cysts, it has been reported that subsequent biliary malignancy developed in the remnant bile duct after cyst excision.

Method: We herein report three cases of subsequent biliary malignancy following cyst excision for congenital choledochal cysts and review of the literature to clarify the clinical features of this condition.

Results: Three patients had subsequent biliary malignancy at 13, 15, and 32 years following cyst excision. The anatomical sites of these malignancies were the intrahepatic ($n = 1$), hilar ($n = 1$), and intrapancreatic ($n = 1$) bile ducts. Surgical resection procedures included left trisectionectomy ($n = 2$) and pancreaticoduodenectomy ($n = 1$). One patient had a tumor showing direct invasion to the duodenum and pancreas without lymph node metastases. Another patient had a tumor showing invasion to the main portal vein without lymph node metastases. The other patient had a tumor with periaortic lymph node metastases. These three patients died of disease 9, 15, and 35 months after resection of the subsequent biliary malignancy.

In the literature, we found 32 patients with subsequent biliary malignancy following cyst excision. The anatomical sites of these tumors were the hilar ($n = 17$), intrahepatic ($n = 9$), and intrapancreatic ($n = 6$) bile ducts. The median interval between cyst excision and the detection of this complication was six (range, 1–34) years. Twelve patients were treated with supportive care and 14 patients received either surgical resection ($n = 11$), chemoradiotherapy ($n = 2$) or chemotherapy ($n = 1$). There were no 4-year survivors among the 32 patients.

Conclusions: Subsequent biliary malignancy seems to be found in the long-term even after cyst excision for congenital choledochal cysts. Despite an aggressive treatment approach, the subsequent biliary malignancy following cyst excision shows an unfavorable outcome.

PO14-01

CONCURRENT VERSUS SEQUENTIAL NEOADJUVANT CHEMORADIOOTHERAPY FOLLOWED BY SURGERY IN OPERABLE CARCINOMA GALLBLADDER PATIENTS: A PILOT STUDY

Ameet Kumar¹, Sujoy Pal¹, Nihar Ranjan Dash¹, Atul Sharma², Raju Sharma¹, Siddhartha Datta Gupta¹, Bidhu Kalyan Mohanti², Peush Sahni¹ and Tushar Kanti Chattopadhyay¹

¹All India Institute of Medical Sciences, India; ²BRA IRCH, All India Institute of Medical Sciences, India

Introduction: A multimodality approach may improve the poor survival and high recurrence rates following curative resections in locally advanced gallbladder cancer (LA-GBC). Only one previous study has examined the role of neoadjuvant chemoradiotherapy (NACRT), albeit in incidental GBC. This pilot study was done to evaluate the safety and efficacy of NACRT in resectable LA-GBC.

Method: Sixteen patients were alternately allocated to *sequential* (arm A: 8) and *concurrent* (arm B: 8) NACRT. Eligibility criteria included chemo-radiotherapy-naïve patients with cytologically proven, operable GBC (stage III: 12/IVA: 4, without vascular involvement and metastasis- excluded by laparoscopy). Arm A received GEMOX (300 mg/m²/50 mg/m²) weekly for 4 weeks. Arm B received GEMOX (900 mg/m²/80 mg/m²) on days 1, 8, 22 and 29. Radiotherapy (35 Gy/15 fractions) was administered in both arms. Following NACRT these patients were reassessed by CT before surgery. (TRIAL REGISTRATION: CTRI/2011/12/002264).

Results: In arm A, radiological complete response (rCR), partial response (rPR) and progressive disease (rPD) was seen in 1, 2 and 4 patients, respectively and 1 died of severe cholangitis before response assessment. In arm B, rCR, rPR and stable disease was seen in 1, 6 and 1 patient, respectively. The overall response rates were significantly better in arm B (8/8 vs. 3/8; $p = 0.03$). Grade III toxicity occurred in only 1 patient. Eight patients (arm A: 2, arm B: 6) underwent surgical excision with an R0 resection. Pathological CR was seen in 1 (arm A) and pPR in 7 patients (arm A: 1,

arm B: 6). At a median follow up of 16.2 months, the mean overall survival in arms A and B were 9.5 and 14.2 months, respectively ($p = 0.5$).

Conclusions: Both sequential and concurrent NACRT were safe and efficacious in LA-GBC. Concurrent NACRT allowed more frequent R0 surgical resection, had better response rate and longer overall survival.

PO14-02

SIMPLE VS. EXTENDED CHOLECYSTECTOMY FOR T1b GB CANCER

JongHee Yoon, Jeong-su Nam, Jae Hoon Lee, Ki-byung Song, Kwang-Min Park and Young-Joo Lee
Asan Medical Center, Ulsan University, Korea

Introduction: The purpose of this study was to assess the effectiveness of simple and extended cholecystectomy for muscularis (T1b) gallbladder cancer by analysis of surgical outcomes at a single institution.

Method: Archived records of 85 patients with pathologic stage T1b GB cancer who underwent surgery between 1997 and 2010 were reviewed.

Results: Among 806 patients of GB cancer that underwent surgery, 85 (10.5%) were diagnosed as pathologic stage T1b cancer. Simple and extended cholecystectomy were performed in 48 (56.5%) and 37 (43.5%) patients, respectively. 5-year survival rate was 78.2% in simple cholecystectomy and 91.0% in extended ($p = 0.108$) respectively. There was no statistically significant difference but it is better tendency in extended cholecystectomy than simple cholecystectomy. After simple cholecystectomy, re-resections were performed in 7 cases. There was no survival benefit. There were recurrences in 6 (7%) patients. Average period of recurrence is 27 months (range 4 ~ 47). Out of six patients, four patients underwent simple cholecystectomy and the rest 2 patients extended cholecystectomy. It was higher risk of recurrence rate in simple cholecystectomy than extended. Out of four patients, two patients underwent reoperation and are alive. The rest two patients were dead. Two recurred patients who underwent extended cholecystectomy were dead. Majority of recurrence site was lymph node of hepatoduodenal ligament. We can't identify lymph node status exactly. Because of 65 (76.5%) patients didn't undergo lymph node dissection. There was no lymph node metastasis in the rest 20 patients.

Conclusions: If the disease stage is determined to be T1b, it is concluded that simple cholecystectomy alone is statistically curative regardless of operational method (laparoscopic or open). But, extended cholecystectomy is better tendency of 5-year survival rate and lower risk of recurrence rate than simple cholecystectomy. And majority of recurrence site is lymph node of hepatoduodenal ligament. In light of these, extended cholecystectomy is recommended in low operative risk patients.

PO14-03

IMPACT OF ADDITIONAL RESECTION FOR INCIDENTAL GALLBLADDER CANCER

Hiroki Hayashi¹, Fuyuhiko Motoi¹, Hiroshi Yoshida¹, Takanori Morikawa¹, Takaho Okada¹, Kei Nakagawa², Takeshi Naitoh¹, Yu Katayose² and Michiaki Unno²

¹Tohoku University Hospital Japan; ²Tohoku University School of Medicine, Japan

Introduction: In spite of the improvement of diagnostic imaging system, we sometimes encounter incidental gallbladder cancer that was undiagnosed before operation. If gallbladder cancer is suspected during an operation, it is difficult to change the operative procedure because there are many different variations on the operative procedure depending on the cancer spread and stage. For those patients, surgeons sometimes performed cholecystectomy and made consideration whether the additional resection is necessary or not on the basis of histological diagnosis of the cancer depth and cancer remnant.

Method: Incidental gallbladder cancer patients after cholecystectomy were enrolled in this study. The prognosis of the patients with or without additional secondary resection was analyzed with respect to the cancer depth.

Results: 38 incidental gallbladder cancer patients (7, 6, 15, 10 patients were T1a, T1b, T2, T3 in the 7th UICC TNM classification, respectively) were enrolled. 28 patients (2, 5, 12, 9 patients were T1a, T1b, T2, T3, respectively) underwent secondary resection. There were no T4 patients in this study. The mean interval of time between first and second operation was 1.43 months. None of T1a patients had a recurrence with or without secondary resection. Two patients with T1b gallbladder cancer were referred to our hospital due to the recurrence during observation without secondary resection. The prognosis of secondary resected patients with T2 and more were statistically equal to those of the patients with elective surgery in our institute who were preoperatively diagnosed as gallbladder cancer.

Conclusions: No additional resection is needed for T1a patients. Additional resection is necessary to improve the prognosis of T2 and T3 incidental gallbladder cancer patients. Additional resection is also recommended for T1b patients because of the possibility of infrequent recurrence. If T1b and more incidental gallbladder cancer were detected histologically after cholecystectomy, additional resection should be done as soon as possible.

PO14-04

STAGING, RESECTABILITY, AND OUTCOMES IN PATIENTS WITH GALLBLADDER CARCINOMA

Ahmed Elgendi, Samer Bessa, Mohamed Sharaan and Maher Elzeini

Alexandria university, Egypt

Introduction: Carcinoma of gallbladder is the most common biliary tract malignancy. Unfortunately it usually presents late in an advanced stage. The authors analyze and assess the management and outcome in

patients with gallbladder cancer in a single tertiary referral center.

Method: Between 2009 and 2013, a prospectively maintained database for 31 patients with gallbladder cancer treated at our institution was developed. Patients, who were unresectable, were treated with chemotherapy and metallic stent if jaundiced. Curative resections included extended cholecystectomy (wedge resection of GB bed), more extensive hepatectomy (segmentectomy IVb and V or right hepatectomy) and extra-hepatic biliary ducts excision.

Results: Thirty-one patients were included in the study. Nearly three quarters ($n = 23$) of them died due to cancer. The median survival time was 10.00 (SE = 2.78) months. Using life-table, the time of the greatest risk was during the first year (hazard rate = .06). Hazard rate dropped dramatically during the second (hazard rate = .01) and the third year (hazard rate = .01). Using log-rank test, the following covariates were found to increase the survival of patients: surgical resection of the tumor ($X^2 = 21.18$, $p < .001$), R0 ($X^2 = 18.34$, $p < .001$), absence of lymph-nodal metastasis ($X^2 = 21.59$, $p < .001$), absence of local invasion ($X^2 = 8.90$, $p = .003$), and incidental discovery of gall bladder ($X^2 = 14.00$, $p < .001$). Exposure to chemotherapy was found to significantly improve the survival of patients who did not undergo surgical treatment ($X^2 = 15.51$, $p < .001$), but not among the patients who undergo surgical treatment ($X^2 = 1.63$, $p = .202$). Using log-rank test for trend, the poorly differentiated tumors ($X^2 = 8.90$, $p = .006$) and advancing in tumor stage ($X^2 = 19.51$, $p < .001$) significantly decreasing patients survival.

Conclusions: Although much progress has been made in the diagnosis and management of gallbladder carcinoma, the long-term outlook for most patients is still dismal. Only complete tumor resection, including hepatic resection, enables long-term survival for patients. Chemotherapy has a significant benefit in term of survival rate compared with no treatment.

PO14-05

INCIDENTAL NON-BENIGN GALLBLADDER HISTOPATHOLOGY AFTER ROUTINE CHOLECYSTECTOMY IN A UK POPULATION

Khaled Dajani, Krashna Patel, Raaj Praseedom, Neville Jamieson, Asif Jah, Simon Harper and Emmanuel Huguet

Addenbrooke's Hospital, United Kingdom

Introduction: Selective histological assessment of resected gallbladders from routine cholecystectomies is a growing trend due to rarity of incidental gallbladder malignancy. We aim to analyse the range of histopathology detected in the largest UK series of routine cholecystectomy specimens.

Method: Data for all routine cholecystectomy gallbladder specimens examined by the histopathology department at Addenbrookes University Hospital (Cambridge, UK) during a 5 year period between March 2008 and March 2013 was obtained via a computerised database. This study collected data on all specimens demonstrating

gallbladder pathology other than gallstones or cholecystitis. Hospital computer software and patient hardcopy notes were used to collate demographic, operative and histopathological parameters.

Results: A total of 4250 gallbladders were examined in the 5 year period described. The majority (97%) of specimens exhibited gallstone disease or cholecystitis related disease. 43 gallbladders (1.01%) demonstrated polyps, most cholesterol based in nature (41/43). 55 resected gallbladders exhibited dysplastic changes (1.29%), ranging from low to multifocal high-grade dysplasia (4/55). A single gallbladder revealed carcinoma in situ (0.02%) and 8 specimens (0.19%, 6 female and 2 male) contained incidental primary gallbladder adenocarcinoma.

Conclusions: This large single centre study demonstrated a full range of benign and malignant gallbladder disease from histological assessment of routine cholecystectomy specimens. We report 0.19% incidence of incidental gallbladder malignancy from routine cholecystectomies. We conclude that routine histological evaluation of all elective and emergency cholecystectomies is justified in a UK population. Region based selective histological evaluation has the potential to miss serious gallbladder pathology.

PO15-01

INDICATIONS FOR LIMITED RESECTION IN THE THERAPEUTIC STRATEGY FOR NEOPLASMS OF THE AMPULLA OF VATER

Masaru Koizumi, Naohiro Sata, Yukihiro Sanada, Yuji Kaneda, Yasunao Ishiguro, Atsushi Miki, Hideki Sasanuma, Yasunaru Sakuma, Alan Lefor and Yoshikazu Yasuda

Jichi Medical University School of Medicine, Japan

Introduction: We have emphasized the complications and uncertain pathological evaluation of the resection margin after endoscopic papillectomy, and have reported the usefulness of limited surgical resection, such as transduodenal papillectomy (TDP), transabdominal papillectomy (TAP) and pancreas-sparing duodenectomy (PSD). The aim of this study is to determine the indications for limited resection of neoplasms of the ampulla of Vater (NPV).

Method: From 1992 to 2013, 90 patients with NPV underwent resection at Jichi Medical University Hospital, Tochigi, Japan. Fifteen patients (17%, 13 male and 2 female, mean age 57.6) underwent limited resection (10 TDP, 4 TAP and 1 PSD).

Results: Endoscopic ultrasonography (EUS) and/or intraductal ultrasonography (IDUS) were performed pre-operatively in all patients and no pancreatic and/or duodenal invasion was detected. Pathologically, 7 adenomas and 8 adenocarcinomas including 6 mucosal carcinomas and 2 od-carcinomas (limited to the sphincter of Oddi) were confirmed. All adenomas had negative surgical margins. One mucosal carcinoma had a positive surgical margin in the bile duct and pylorus preserving pancreatoduodenectomy (PpPD) was subsequently performed. Another od-carcinoma underwent PpPD, as 31% of od-carcinomas had lymph node metastases in

our previous series. Pathological evaluation showed residual carcinoma in both cases, but no lymph node metastases. All patients are alive without recurrence.

Conclusions: NPVs often have mucosal spread into the biliary and/or the pancreatic ducts, which cannot be detected by preoperative EUS and/or IDUS. Limited resection for NPV has the advantage of precise pathological evaluation especially in early stage lesions. A “step-up” strategy with limited resection as the primary procedure followed by PpPD after pathological evaluation is feasible for the treatment of early-stage NPV.

PO15-02

FULL-THICKNESS CHOLECYSTECTOMY WITH LIMITED LYMPHADENECTOMY FOR GALLBLADDER CANCER

Tomohiro Katada¹, Jun Sakata¹, Yuki Hirose¹, Natsuru Sudo¹, Kazuyasu Takizawa¹, Kabuto Takano¹, Takashi Kobayashi¹, Masahiro Minagawa¹, Yoshio Shirai² and Toshifumi Wakai¹

¹Niigata University Graduate School of Medical and Dental Sciences, Japan; ²Niitsu Medical Center Hospital, Japan

Introduction: Aggressive radical resection is advocated for gallbladder cancer. However, this is a disease of the elderly and some patients have comorbid disease(s) and/or a debilitated condition that may preclude such an aggressive treatment strategy. This study aimed to clarify indications for a minimum radical procedure for gallbladder cancer, termed as “full-thickness cholecystectomy with limited lymphadenectomy”.

Method: From 1992 through 2010, 12 patients underwent full-thickness cholecystectomy with limited lymphadenectomy in the study department. This procedure involves full-thickness resection of the gallbladder (cholecystectomy combined with removal of the entire cystic plate) and removal of the first-echelon lymph nodes (the pericholedochal and cystic duct node groups). We mainly applied this procedure to patients with advanced age and/or comorbid disease(s) with tumor confined to the gallbladder wall and no gross evidence of distant metastases/nodal disease.

Results: The primary tumor was classified as pathological T1a (pT1a) in 6 patients, pT1b in 2, and pT2 in 4 (according to the American Joint Committee on Cancer Staging Manual, 7th edition). Two patients had lymph node metastases; one patient had a positive pericholedochal node and the other had a positive cystic duct node. No in-hospital mortality has been associated with this procedure and no patients have died of recurrent disease. In our series, the median overall survival was 229 months with a cumulative 5-year overall survival rate of 100%. Of note, one of our patients who showed a positive pericholedochal node survived for more than 5 years.

Conclusions: Full-thickness cholecystectomy with limited lymphadenectomy is a minimum radical procedure for gallbladder cancer that is safe and effective for early-stage tumors. This less invasive procedure can be applied to patients with advanced age and/or comorbid disease(s), provided that the tumor is apparently con-

fined to the gallbladder wall and has no gross evidence of distant metastases/nodal disease.

PO15-03

THE NEOADJUVANT CHEMORADIATION THERAPY WITH GEMCITABINE FOR R0-RESECTION OF POSSIBLY RESECTABLE CHOLANGIOCARCINOMA

Kei Nakagawa, Yu Katayose, Koji Fukase, Masamichi Mizuma, Naoaki Sakata, Takaho Okada, Hiroki Hayashi, Hiroshi Yoshida, Fuyuhiko Motoi and Michiaki Unno

Tohoku University Graduate School of Medicine, Japan

Introduction: To improve the prognosis of cholangiocarcinoma patients, we have applied neoadjuvant chemoradiation therapy (NACRT) followed by conventional resection for possibly resectable cholangiocarcinoma. We showed that neoadjuvant chemoradiation with conventional resection was safe and tolerable (Hepatogastroenterology. 2011;58:1866-72). Then, we proceeded Phase II study (P-2). Here, we evaluated P-2 as an interim analysis and compared the P-2 group and 99 patients who were operated on using conventional resection at the same stage and same period as the P-2 group in terms of the perioperative factors and effectiveness.

Method: Regimen of P-2 was 600 mg/m² of gemcitabine (day 1 and 8 × 2 courses) with external beam radiation therapy (1.8-Gy daily, 45 Gy). Patients with histologically or cytologically confirmed adenocarcinoma of the extra- and hilar cholangiocarcinoma were enrolled from 2008 to June 2012. The primary endpoint was the R0-resection rate. We thought the R0-resection rate was 60% referring to our previous data, assumed that it would increase to 80% with neoadjuvant chemoradiation treatment. We determined that the enrollment should be 40 cases assuming 10% of the patients would drop out.

Results: As interim analysis, 22 patients were enrolled in P-2. 21 patients received complete chemoradiation. 19 cases were operated on, and 18 cases were resected. Three cases were not operated on. Two cases were progressing disease, and one was heart failure. The R0-resection rate of the P-2 group and conventional resection group was 62% (13 cases out of 22 cases) and 36% (36 cases out of 99 cases), respectively (p < 0.05). Intraoperative bleeding, operative duration and hospital stay after surgery were not significant and surgical site infection (SSI) was also not significant.

Conclusions: NACRT with conventional resection appears to be effective and well tolerated. We are going to continue to further patient registration, to analyze the benefits of this regimen.

PO15-04

INTER-AORTOCAVAL LYMPH NODE BIOPSY AS PART OF STAGING LAPAROSCOPY FOR GALLBLADDER CANCER: A PILOT STUDY

John Mathew, Raja Kalayarasan, Amit Javed and Anil Agarwal

GB Pant Hospital & MAM College, India

Introduction: Conventional staging laparoscopy (SL) picks up surface liver metastasis and peritoneal deposits. Involvement of inter-aortocaval (IAC) lymph node in gallbladder cancer (GBC) is a sign of advanced disease. Traditionally IAC node sampling biopsy is done at the time of laparotomy before proceeding with radical resection. Significant proportion of patients therefore undergo a non-therapeutic laparotomy, when IAC lymph node are found to be positive for malignancy on per-operative frozen section analysis signifying metastatic disease. Hence this study was done to evaluate the feasibility and outcome of laparoscopic IAC sampling biopsy as part of SL.

Method: We conducted a pilot study of laparoscopic sampling biopsy and frozen section examination of IAC node in selected patients deemed operable on pre-operative evaluation and initial staging laparoscopy (SL). The procedure was performed using four ports (two in incision line) with the patient in the modified lithotomy position. Early GBC was defined T1/T2 stage tumors, while T3/T4 tumors were classified as locally advanced.

Results: Seventeen patients (early GBC-9, locally advanced GBC-8) deemed operable on preoperative evaluation were planned for laparoscopic IAC sampling biopsy. The procedure was successfully completed in 15 (88.2%) patients (study group), whereas in 2 the procedure was converted to open due to suspected adjacent organ involvement at the time of SL. Median (range) lymph node yield was 2 (1-3). None of the patients had complications related to the procedure. Of the 15 patients, one had evidence of metastasis on frozen section examination and the procedure was abandoned. Of the remaining 14 patients, 11 underwent laparoscopic radical cholecystectomy and 3 underwent open radical cholecystectomy.

Conclusions: Laparoscopic IAC sampling biopsy is technically feasible in selected GBC patients without adjacent organ involvement. It has the potential to improve the yield of SL without increasing the morbidity of the procedure. This avoids unnecessary non therapeutic laparotomy.

PO15-05

"EXTENDED" RADICAL CHOLECYSTECTOMY FOR GALLBLADDER CANCER

Jun Sakata, Taku Ohashi, Yuki Hirose, Tomohiro Katada, Natsuru Sudo, Kazuyasu Takizawa, Kabuto Takano, Takashi Kobayashi, Masahiro Minagawa and Toshifumi Wakai

Niigata University Graduate School of Medical and Dental Sciences, Japan

Introduction: Although "extended" radical cholecystectomy was widely used for gallbladder cancer among Japanese surgeons, indications for this procedure have not yet been established. This study aimed to delineate indications and limitations in using extended radical cholecystectomy for gallbladder cancer.

Method: Of 145 patients who underwent a radical resection for gallbladder cancer, 52 (36%) had an extended radical cholecystectomy, which involved *en bloc* resection of the gallbladder, gallbladder fossa, extrahepatic bile duct, and the regional lymph nodes. A retrospective analysis of the 52 patients was conducted including at least 5 years of follow up.

Results: Overall survival after resection was 65% at 5 years in all 52 patients. Overall survival differed according to the pathological T (pT) classification ($p < 0.001$) and the nodal status ($p = 0.010$). All of three patients with pT1 tumors and most (29 of 36) patients with pT2 tumors survived for more than 5 years. Of 12 patients with pT3 tumors, eight who had an R1-2 resection, distant metastasis, or extensive extrahepatic organ involvement died soon after resection. Of the remaining four pT3 patients who had localized hepatic spread through the gallbladder fossa and underwent an R0 resection, two survived for more than 5 years and another survived for 4 years 2 months. The only patient with pT4 tumor died of disease soon after resection. Among 23 node-positive patients, 11 survived for more than 5 years, and of these 10 had a modest degree of nodal disease (one or two positive nodes).

Conclusions: Extended radical cholecystectomy is indicated for pT2 tumors and some pT3 tumors with localized hepatic invasion, provided that the nodal disease is limited to a modest degree (up to two positive nodes). Extensive pT3 disease, pT4 disease, or marked nodal disease appears to be beyond the scope of this radical procedure.

PO16-01

LIVING DONOR LIVER TRANSPLANTATION FOR MIXED HEPATOCELLULAR AND CHOLANGIOCARCINOMA – OUTCOMES

Kumar Palaniappan, Mukul Vij, Rajasekhar Perumalla, Gomathy Narashiman, Vivekandan Shanmugam, Srinivas Reddy, Thomas Cherian and Mohamed Rela

Global hospitals & Health city, Chennai, India

Introduction: Combined Hepatocellular Cholangiocarcinoma (cHCC-CC) are rare primary liver tumors accounting for <1% of all liver cancers. Although transplantation has demonstrated survival benefit for patients with hepatocellular carcinoma (HCC), there is limited data to support or refute transplantation for combined hepatocellular-cholangiocarcinoma (cHCC-CC).

Method: Total of 240 patients underwent transplantation from January 2010 to July 2013. Of these about 160 was living related liver transplantation. Three patients who were suspected to have HCC, had cHCC-CC in their explants. All the three patients had local

ablative therapy - TACE or RFA in the preoperative period.

Results: Of the three patients, two were females aged 46 & 54 years. Other patient was male aged 56. CECT was suggestive of hypervascular lesion. Alfa fetoprotein levels were normal (40–95 iu). Two patients had Allen-Lisa Type II tumors & other had Type III. One patient has TACE, before transplantation. Two other patients had Radio frequency ablation before transplantation. The size varied between 3 cm to 6.5 cms. The follow-up varies between 3 to 20 months (Mean of 14.5 months). All patients are alive without disease recurrence at a median interval of 14.5 months.

Conclusions: Transplantation for localized cHCC–CC confers a survival benefit similar to transplantation for HCC. But the number of patients who underwent transplantation are few for cHCC–CC. With survival data that mimics historic reports of transplant for intrahepatic cholangiocarcinoma, this study questions the benefit of transplantation for patients with cHCC–CC & recommends more follow up & studies for improving outcomes.

PO16-02

HIGH SERUM VASCULAR ENDOTHELIAL GROWTH FACTOR LEVELS PREDICT POOR PROGNOSIS IN PATIENTS UNDERGOING LIVER TRANSPLANTATION WITH HEPATOCELLULAR CARCINOMA: EXPERIENCE OF A SINGLE WESTERN CENTER

Wei Zhang, Cristiano Quintini, Koji Hashimoto, Masato Fujiki, Teresa Diago, Dymrna Kelly, Bijan Eghtesad, Charles Miller, John Fung and Federico Aucejo

Cleveland Clinic Foundation, USA

Introduction: Vascular endothelial growth factor (VEGF) has an important role in hepatocellular carcinoma (HCC) development by fostering tumor cell proliferation and new tumor vessel formation. Recent studies demonstrated the prognostic value of serum VEGF levels in patients undergoing liver resection or locoregional therapies for HCC. Most studies have been generated in Asian countries, and limited data correlating serum VEGF in the setting of liver transplantation (LT) for HCC is available. This study investigated the prognostic significance of pre-transplant serum VEGF levels in patients with HCC undergoing LT in a large western transplant center.

Method: From January 2007 to December 2011, pre-LT serum VEGF levels were measured by an enzyme-linked immunoassay in 113 patients with HCC. Median VEGF level was used as the cutoff value to determine high and low serum VEGF levels. Serum VEGF levels were correlated with clinicopathological characteristics and overall and recurrence-free post-LT survival.

Results: Pre-LT serum VEGF levels were significantly associated with multiple tumors ($p = 0.021$), total tumor size greater than 5 cm ($p = 0.005$), vascular invasion ($p = 0.000$), and beyond Milan criteria ($p = 0.004$). Multivariate analyses revealed that serum VEGF level

>35 pg/mL was independently associated with vascular invasion ($p = 0.003$). Patients with serum VEGF level >35 pg/mL had higher tumor recurrence rate, worse overall and recurrence-free survival compared with those with serum VEGF level ≤ 35 pg/mL ($p = 0.000$, 0.019 and 0.010, respectively). Serum VEGF level and Milan criteria were identified by multivariate analysis as independent predictors of both overall and recurrence-free survival.

Conclusions: In patients with chronic end stage liver disease, median pre-LT serum VEGF level >35 pg/mL appears to be a predictor of vascular invasion and post-transplant HCC recurrence. Due to the absence of accurate prognostic biomarkers in the current era regarding LT in the setting of HCC, further studies are warranted to confirm this relevant observation.

PO16-03

SYNERGISTIC EFFECTS OF METFORMIN IN COMBINATION WITH RAPAMYCIN ON HEPATOCELLULAR CARCINOMA CELL LINES

Kwang-Woong Lee, Jeong-Moo Lee, Suk-Won Suh, Tae You, Youngrok Choi, Nam-Joee Yi and Kyung-Suk Suh

Seoul National University Hospital, Korea

Introduction: Several studies have shown that metformin had an anti-tumor effect on several cancers, including hepatocellular carcinoma (HCC). After liver transplantation (LT), immunosuppression is needed to avoid rejection and graft loss, however, it can stimulate HCC recurrence and progression. The aim of this study was to evaluate interactions between metformin and immunosuppressive agents for antitumor activity.

Method: Antiproliferative effects were assessed using HCC cell line as HepG2, Hep3B, Huh7. Metformin (10 mM/L) and several immunosuppressive agents such as Sirolimus (5 ng/mL), Tacrolimus (5 ng/mL), and MMF (500 ng/mL) were evaluated. Cell viability was determined using a standard colorimetric 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay after 48 hours. Western blot analysis was performed to investigate protein levels in HCC cells.

Results: Metformin and Sirolimus itself had antitumor effect in all of the HCC cell lines (73% and 66%, HepG2; 84% and 73%, Hep3B; 77% and 66%, Huh7). They also had significant synergistic antiproliferative effect in all of the HCC cell lines (68%, HepG2; 57%, Hep3B; 63%, Huh7), however, there was no synergistic effect with other immunosuppressive agents. In addition, combination of metformin, sirolimus and MMF showed some synergistic antiproliferative effect in Hep3B and Huh7 HCC cell lines (53%, Hep3b; 53%, Huh7).

Conclusions: Metformin had synergistic interactions with Sirolimus in terms of antitumor effects for HCC cell lines. These results may provide a foundation for further studies to evaluate combination therapies for patients with HCC who underwent LT in clinical era.

PO16-04

PRETRANSPLANT SERUM ALPHA-FETOPROTEIN HAS NO PROGNOSTIC ROLE IN PATIENTS WITH HBV-ASSOCIATED HEPATOCELLULAR CARCINOMA WITHOUT VASCULAR INVASION

Guo-Ying Wang, Shu-Hong Yi, Hua Li, Wei Meng and Gui-Hua Chen

The Third Affiliated Hospital of Sun Yat-Sen University, China

Introduction: Alpha-fetoprotein (AFP) has been proposed to correlate with vascular invasion of hepatocellular carcinoma (HCC) and predict tumor recurrence after liver transplantation (LT). However, the prognostic value of AFP in patients with HCC without vascular invasion during the waiting list for LT has not been clearly defined.

Method: We analyzed the outcome of 80 patients who underwent LT for HBV-associated HCC without vascular invasion. Vascular invasion was defined as the presence of tumor emboli within the lobar or segmental branches of the portal or hepatic veins, which was diagnosed or highly suspected by preoperative imaging examination. Patients were divided into two groups according to different AFP cut-off level.

Results: The 1-, 3- and 5-year disease-free and overall survivals were 97.1%, 89.1%, and 79.9%, and 92.1%, 81.5%, and 72.7%, respectively. Ten patients developed tumor recurrence and 13 patients died during 6 years of follow-up. Univariate analysis revealed that multiple tumor number was the only preoperative predictor of disease-free survival (DFS). Surprisingly, there was no significant difference in DFS with regard to the tumor size, AFP level, preoperative tumor therapy, histologic grade, Milan criteria, and UCSF criteria. All four patients with tumor size greater than 8 cm had no tumor recurrence during 3 years of follow-up. The 3-, and 5-year DFS for patients with $\text{AFP} \leq$ or >400 ng/mL were 86.8%, 82.4%, and 86.8%, 72.4%, respectively ($p > 0.05$). The disease-free and overall survivals were not significantly different among the five AFP classes (≤ 20 ; 21–100; 101–200; 201–400; >400 ng/mL).

Conclusions: Preoperative AFP has no prognostic role in patients who underwent LT for HCC without vascular invasion. Although the accuracy and objectivity of the radiological imaging remains a problem, carefully studying the radiologic imaging is still regarded as a first-line test for selecting appropriate candidates for LT and predicting tumor recurrence following LT in patients with HCC.

PO16-05

SALVAGE LIVING DONOR LIVER TRANSPLANTATION AFTER PRIOR LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA

Hyung Woo Park, Shin Hwang and SungGyu Lee
Asan Medical Center, Ulsan University, Korea

Introduction: Salvage liver transplantation has been performed for recurrent hepatocellular carcinoma (HCC) or deterioration of liver function after primary hepatectomy. Living-donor liver transplantation (LDLT) can be performed for salvage purpose. To assess the technical feasibility and indication of salvage LDLT for recurrent HCC, we assessed our experience performing these surgical procedures over 15 years.

Method: From our institutional database of LDLT, we selected 75 cases of salvage LDLT after prior hepatectomy for HCC. The medical records of 75 patients who followed up more than 12 months were retrospectively reviewed.

Results: Male patients were 65. Mean patient age was 53.1 ± 7.4 years. The extents of prior hepatectomy were sectionectomy or less in 58 and hemihepatectomy or bissectionectomy in 17. Graft types were right liver grafts in 64, dual-grafts in eight and left grafts in three. Mean GRWR was 1.09 ± 0.24 . Perioperative mortality within 3 months were four (5.3%). The Milan criteria were met in 48 (64%). Five-year patient survival rates were 88.1% in within-Milan and 38.7% in beyond-Milan ($p < 0.001$). Five-year HCC recurrence rates were 7.3% in within-Milan and 81.8% in beyond-Milan ($p < 0.001$). Preoperative alpha-fetoprotein cutoff at 200 ng/mL and microvascular invasion didn't show survival difference.

Conclusions: Overall patient survival rates following salvage LDLT were similar to those following primary LDLT, especially when the HCC satisfies the Milan criteria. Therefore, we strongly suggest that every combination of prior hepatectomy and LDLT is feasible for patients undergoing salvage LDLT and the acceptable extent of HCC for salvage LDLT is equivalent to that for primary LDLT.

PO17-01

ASSESSMENT OF PROGNOSIS IN FULMINANT HEPATIC FAILURE WITH MELD AND BILIRUBIN-LACTATE-ETIOLOGY SCORE IN PATIENTS LISTED FOR EMERGENCY LIVER TRANSPLANTATION FROM A SINGLE BRAZILIAN CENTER

Joel Avancini Rocha Filho¹, Estela Regina Ramos Figueira¹, Adriana Rochetto Assalin², Eleazar Chaib¹, Luciana Bertocco Paiva Haddad¹, Alberto Queiroz Farias¹, Cinthia Lanchotte¹ and Luiz Augusto Carneiro D'Albuquerque¹

¹*Hospital das Clinicas University of Sao Paulo, Brazil;*

²*University of Sao Paulo, Brazil*

Introduction: Fulminant hepatic failure (FHF) is a severe life-threatening multisystem disease. Several authors have proposed prognostic criteria to indicate LT for patients with little chance of spontaneous recovery. We aimed to evaluate MELD and Bilirubin-Lactate-Etiology (BiLE) scores to determine prognosis of patients with FHF in the transplantation waiting-list.

Method: We retrospectively evaluated 100 adult patients with FHF referred to urgent transplantation. Indication for LT was determined according to KCC.

We analyzed age, sex, etiology, prioritization-to-LT time intervals, encephalopathy, bilirubin, creatinine, lactate, MELD and the BiLE score (bilirubin [mol/L]/100 + lactate [mmol/L] + etiology). Data were collected at time of prioritization to LT.

Results: Seventy-eight (78%) patients were female with 35.5 ± 14.7 yo. Etiologies were virus in 17% of cases, drug-induced in 29%, autoimmune in 13%, cryptogenic in 34% and other in 7%. The prioritization-to-LT time interval was 1.5 days (0–9). Thirty-one patients died in waiting-list and 69 were submitted to LT. The non-LT patients showed increased lactate (78.4 ± 48.3 vs. 41.8 ± 30.6 mg/dL), creatinine (2.60 ± 2.34 vs. 1.55 ± 1.54 mg/dL), MELD (44 ± 8 vs. 38 ± 8) and BiLE score (15.8 ± 5.5 vs. 10.3 ± 4.1) compared to LT patients ($p < 0.05$). The ROC analysis showed that lactate, creatinine, MELD and BiLE had considerable specificity (76–88%), but only BiLE and lactate presented higher sensitivities (70% and 80%, respectively). Area under curve (AUC) for creatinine was 0.696, for lactate 0.763, for MELD 0.697, and for BiLE 0.814.

Conclusions: Brazilian non-acetaminophen FHF patients not transplanted after fulfillment of KCC, died. In the waiting-list, creatinine, lactate, and MELD and BiLE scores, calculated at the moment of LT indication, could predict poor outcome. BiLE and lactate presented higher sensitivities. We need more studies to identify early markers of poor prognosis to enhance the “window of opportunity” for successful surgery.

PO17-02

VEIN RECONSTRUCTION IN MODIFIED RIGHT LIVER GRAFT FOR LIVING DONOR LIVER TRANSPLANTATION IN MONGOLIA

Batchuluun Pandaan, Sergelen Orgoi, Amgalan Luvsandorj, Erdene Sandag, Batireedui Badarch, Ganzorig Barjargal, Ganbold Lundeg, Chuluunbaatar Donhim and Davaadorj Duger

Department of Mongolian Liver Transplant Team, Mongolian Liver Transplant Team, Mongolia

Introduction: Using donor's liver right lobe with MHV (extended right lobectomy) is a beneficial approach for the recipient but there is high risk involved. From 1998 to 2001 Lee et al performed 176 Modified Right Liver Graft cases using MRLG with S5 and S8 reconstructions.

Method: These reconstructions were made with Gore-Tex grafts, recipient's iliac veins, umbilical veins and cadaveric iliac arteries and veins. So far over 3500 cases of A2ALDLT using MRLG have been performed successfully in Asan medical center.

Results: From 9th of October, 2011 to September, 2013 Mongolian Liver Transplantation Team performed 11 cases of adult-to-adult LDLT in National First Clinical Hospital of Mongolia with cooperation of Asan Medical Center, 10 cases were performed successfully by the Associated Team in Asan Medical Center. There were nine male (42.8%) and 12 female (57.1%) patients, ranging from 30 to 61 years old. 12 patients (57.1%) had HBV induced LC from that four of which (19%) also had HDV. Four patients (19%)

had HCV induced LC. Five patients (23.8%) had HCC due to HBV. Three patients (14.2%) were C class and 18 (85.7%) patients were B class by Child Pugh classification. Their score ranges from was 9 to 20 points by MELD.

Conclusions: A right liver graft without the MHV trunk (modified right liver graft) is now commonly used but can cause severe congestion of the right paramedian sector. Such congestion can lead to severe graft dysfunction and septic complications because hepatic venous outflow of the right paramedian sector drains mostly into the MHV. MHV drainage into the recipient's venous system can be reconstructed by using vein grafts. If the venous congestive area is demonstrated to be so large that the graft volume excluding this area is thought to be insufficient for postoperative metabolic demand, venous reconstruction is recommended.

PO17-03

DOES OBESITY IMPACT THE PATIENTS' SURVIVAL IN CADAVERIC LIVER TRANSPLANT RECIPIENTS?

Krzysztof Zieniewicz, Michal Grat, Waldemar Patkowski, Tadeusz Wroblewski, Rafal Paluszkiwicz, Piotr Remiszewski, Krzysztof Dudek, Marcin Kotulski, Karolina Wronka and Marek Krawczyk
Medical University of Warsaw, Poland

Introduction: The prevalence of the obesity continues to increase in Western populations. Increased mortality/morbidity is associated with majority of surgical procedures performed in obese patients. Liver transplantation (LTx) is one of the most technically challenging surgical interventions and thus in the group of obese recipients the higher rate of complications and postoperative deaths have been shown. Aim of the study was to analyze the impact of BMI on outcomes of adult cadaveric LTx.

Method: Liver transplant recipients' medical records were analyzed retrospectively. 406 patients (259 men, 147 women) operated on in the period 2009–2013 were included. Retransplantations and ALF patients were excluded. Consecutive patients' BMI was calculated. The data were stratified according to WHO BMI stages: underweight (<18.5), normal weight ($18.6–25.0$), overweight ($25.1–30$), obese (>30.0). The primary outcome was patient/graft survival, the secondary-postoperative complications and the length of ICU and hospital stay.

Results: The reference group were normal weight patients ($n = 197$), 1-year and 3-year patients and graft survival was 90.3% and 89.4%, and 87.2% and 85.5%, respectively. Underweight patients ($n = 16$) and graft 1-year and 3-year survival were equally 81.3%, without statistically significant difference: $p = 0.251$ and $p = 0.547$ - patient and graft survival respectively. Overweight patients ($n = 137$) 1-year and 3-year survival was 86.6% and 85.5% respectively, without difference to the reference group ($p = 0.326$). 1-year and 3-year graft survival in this group was equally 84.9% without difference to the reference group ($p = 0.740$). Finally, obese patients ($n = 56$) survival was 94.4% and 91.7% 1-year and 3-years respectively,

$p = 0.604$. Graft survival in this group was 91.0% 1-year and 88.2% - 3 years, also without the difference to the reference group, $p = 0.635$.

Conclusions: There was no difference in patient/graft survival in our cohort of patients in the subgroups depending on BMI. However overweight and obese patients have increased morbidity and longer hospital stay.

PO17-04

LIVER RETRANSPLANTATION ASSOCIATED WITH KIDNEY TRANSPLANTATION FOR END STAGE LIVER GRAFT DISEASE AND RENAL INSUFFICIENCY: RESULTS OF A BICENTRIC STUDY

Francois Cauchy¹, Eric Vibert², Denis Castaing², Astrid Schielke¹, Fabiano Perdigo¹, Filomena Conti¹, Yvon Calmus¹, Olivier Soubrane¹ and Olivier Scatton¹
¹Saint Antoine Hospital, France; ²Paul Brousse Hospital, France

Introduction: Renal insufficiency jeopardizes the long-term outcome of liver transplant recipients. Hence, in the event of end-stage liver graft disease with chronic renal insufficiency, liver retransplantation associated with kidney transplantation (ReLT-KT) might be required. Yet, the preoperative characteristics, operative results and long-term outcomes of these patients remain poorly described.

Method: Among 3060 patients undergoing liver transplantation (LT) at two transplantation units between 1994–2012, 44 (1.4%) underwent ReLT-KT. Their preoperative characteristics, operative results and long-term outcomes were retrospectively analyzed.

Results: The rate of ReLT-KT grew from 0.31% to 2.27% of all LT performed between 1994–1999 and 2007–2012 respectively ($p < 0.001$). Twenty-nine patients (65.9%) were males and median age was 53.4 (17–73.7) years. Median time from primary LT to ReLT-KT was 150 (7.5–283) months. The most frequent indications for liver retransplantation were recurrence of the primary liver disease, cholangitis and chronic rejection in 15 (34.8%), 14 (34.1%) and 11 (25%) cases respectively. Cirrhosis was present in 29 (65.9%) patients and median MELD score was 22 (9–40). Renal insufficiency was related to calcineurin inhibitors toxicity in 37 (84.1%) cases. Preoperatively, the median glomerular filtration rate was 24 (5–72) mL/mn and 12 (27.3%) patients required dialysis. Eleven (25%) patients died postoperatively, 3 (6.8%) required kidney graft removal and 1 (2.3%) underwent super-urgent liver retransplantation. In multivariate analysis, the only risk factor associated with postoperative mortality was a donor age >42 years (HR: 6.94, 95%CI: 1.28–37.04, $p = 0.019$). Median follow-up was 47 months. Overall survivals at 1, 3 and 5 years were 72.7%, 70.3% and 63.8% respectively. The only factor associated with impaired survival was a donor age >42 years (54.5%, 54.5% and 45.5% vs. 90.9%, 86.4% and 80.6% at 1, 3 and 5 years, $p = 0.027$).

Conclusions: Combined liver retransplantation and kidney transplantation is increasingly performed. These

patients should benefit optimal grafts in order to improve the operative results.

PO17-05

CLINICAL FEATURE AND ETIOLOGY OF SEVENTH-DAY SYNDROME FOLLOWING ADULT LIVING DONOR LIVER TRANSPLANTATION

Shigeyuki Kawachi¹, Minoru Tanabe³, Hideaki Obara², Masahiro Shinoda², Osamu Itano², Naokazu Chiba¹, Kiminori Takano¹, Toru Sano¹, Yuko Kitagawa² and Motohide Shimazu¹

¹Tokyo Medical University Hachioji Medical Center, Japan; ²Keio University School of Medicine, Japan;

³Tokyo Medical and Dental University, Japan

Introduction: Seventh-day Syndrome (7DS) is characterized by sudden failure of a liver graft that had been working normally at about 1 week after transplantation, without an identifiable cause such as hepatic artery thrombosis, severe sepsis, or serious technical complication. The aim of this study is to describe clinical feature and etiology of 7DS occurred after adult living donor liver transplantation (ALDLT).

Method: A retrospective analysis of 111 consecutive ALDLT over a 17-year period revealed that three patients developed clinical sequences typical of 7DS.

Results: The features included: (a) severe liver failure with sudden peak of extremely high liver enzymes at approximately day 7; (b) color Doppler revealed reduced blood flow in the portal and hepatic vein; (c) high fever preceded a sudden rise of liver enzyme; (d) No evidence of vascular thrombosis or stenosis; (e) Initial liver biopsy findings were different but finally massive necrosis was observed. All three patients died in spite of intensive therapies such as a steroid pulse therapy, plasmapheresis, and IV IgG therapy. Although two of three patients had clinical and pathological feature of humoral rejection, pathogenesis of one patient was yet poorly understood.

Conclusions: 7DS is an important complication after ALDLT, which is associated with a high rate of mortality. Pathogenesis of 7DS is yet fully elucidated, however, an antibody-mediated immune response might be one of the causes for 7DS.

PO18-01

CURRENT STATUS OF LDLT IN ASAN MEDICAL CENTER

DongHwan Jung, SungGyu Lee, Shin Hwang, KiHun Kim, ChulSoo Ahn, TaeYong Ha, GiWon Song, GilChun Park, HyungWoo Park and YoHan Park
 Asan Medical Center, Ulsan University, Korea

Introduction: First pediatric living donor liver transplantation (LDLT) was performed in 1994. In 1997, the first successful right-liver LDLT for adults was performed at the Asan Medical Center. The number of LDLTs has increased annually, with 317 transplantations performed in 2011.

Method: From 1994 to September 2012, we performed more than 3000 LDLT. We reviewed the recent changes of LDLT during this period.

Results: Most common indication of pediatric LDLT was biliary atresia and acute liver failure. HBV associated liver cirrhosis (HBV LC) was most common indication of adult LDLT. Proportion of HBV LC has been decreasing from 80% to 67% and alcoholic LC and HCV LC have been increasing up to 11% and 6% recently. Recently urgent LDLT decreased due to national increase of DDLT. Proportion of hepatocellular carcinoma positive patient in adult LDLT has been increased up to 52.3%.

The goal of donor evaluation is to determine whether the donor is medically and psychologically suitable for living donation. Laparoscopic –assisted, hand-assisted, or minimal Incision donor hepatectomy has been increasing.

Major reasons of rejection as suitable live-donors have been ABO blood group incompatibility, unsafe donor liver anatomy concerning small remnant liver volume, small-for-size graft, and the associated donor comorbidities. Dual LDLT, donor exchange LDLT, ABO incompatible LT can expand donor pool in LDLT field. We performed more than 300 adult dual LDLT with various types of graft. There were 26 cases donor exchange for ABO incompatible adult LDLT at AMC from July 2003 to December 2011. 125 cases ABO incompatible LDLT from November 2008 to July 2012 have been performed. The proportion of ABO incompatible LT was increased to 23.1% of all adult LDLT in 2012.

Conclusions: LDLT has evolved to become an indispensable surgical strategy of end stage liver disease. Minimal morbidity and zero mortality of live donors is utmost requirement of LDLT.

PO18-02

ARTERIAL STEAL SYNDROME AFTER LIVING DONOR LIVER TRANSPLANTATION: SINGLE CENTER EXPERIENCE IN EGYPT

Hossam Eldeen Soliman¹, Osama Hegazy¹, Sherif Saleh¹, Taha Yassen¹, Mohamed Elwarrakey², Khaled Yassen², Khaled Abuelkella¹, Tarek Ibrahim¹ and Ibrahim Marwan¹

¹National Liver Institute, Egypt; ²National Liver Institute, Menoufia University, Egypt

Introduction: Arterial steal syndrome (ASS) after liver transplantation has been reported. ASS causes arterial hypo-perfusion of the liver graft and devastating consequences. However, the diagnosis tends to be delayed. We present our experience with these cases.

Method: We reviewed the data 210 cases of LDLT performed by our group. And we found two cases of a gastroduodenal artery (GDASS) steal syndrome and two cases of splenic artery (SASS) steal syndrome was diagnosed and treated.

Results: Operative ligation was done in two cases and embolisation in another cases and no treatment was done in the remaining case. All the cases had a good intraoperative arterial flow as detected by Doppler

ultrasound (DUS). Three cases was discovered several days after transplantation by changes in arterial flow and wave form while the last case presented after 2 months by multiple biliary cystic lesions. Despite treatments all the four patients died due to septic sequelae of biliary complications with subsequent multiorgan failure.

Conclusions: Arterial steal is a rare but should be considered after liver transplantation for unexplained biliary complications. Urgent treatment is mandatory to achieve early clinical improvement before the development of irreversible biliary damage. Multidetector CT angiography may help in early diagnosis of this problem.

PO18-03

AWARENESS AND ACCEPTANCE OF LIVING DONOR LIVER TRANSPLANTATION (LDLT) AMONG MALAYSIANS: A PROSPECTIVE SINGLE-CENTER SURVEY

Peng Soon Koh, Jun Xin Ong, Jun Kit Koong, Boon Koon Yoong and Khoo Leong Ng

University of Malaya, Malaysia

Introduction: Liver transplantation (LT) has been considered one of the treatment modality for hepatocellular carcinoma (HCC). Due to shortage of cadaveric organ donation, living donor organ transplantation plays an important role. In living donor liver transplantation (LDLT), a healthy individual donates part of their liver to those with underlying liver disease. However, awareness among Malaysians with this treatment modality is lacking.

Method: A prospective single-centre survey of family members and friends of patient with HCC who received treatment from our centre from 2011 to 2012 was conducted to gauge their attitude and awareness towards LDLT. Their awareness and acceptance of LDLT were evaluated using a validated questionnaire.

Results: A total of 135 subjects were recruited. About 91.1% (n = 123) respondents had never heard about LDLT. We found 35.6% were willing to donate only to their relatives, while 31.1% subjects were willing to donate to recipients who are related or unrelated. However, 12.6% of the subjects were unwilling donor. The subject's gender, educational level, and financial disposition have shown to have significant bearing on their attitude and understanding towards LDLT (p < 0.05). Respondents who believe that LDLT was ethically acceptable between family members, friends or strangers had more positive attitude or outlook towards living organ donation (p < 0.05). A positive attitude among respondents towards organ donation and LDLT have also shown to be important (p < 0.05).

Conclusions: Understanding among Malaysian subjects towards LDLT remained lacking even among those with close relation to those afflicted with liver diseases such as HCC. A greater acceptance towards living organ donation such as LDLT is associated with respondents who generally have a positive attitude towards living organ donation. More effort needs to be taken to improve awareness among Malaysian subjects.

PO18-04

PORTAL HYPERTENSION ACCELERATES ANTI-DONOR RESPONSE AFTER LIVING DONOR LIVER TRANSPLANTATION BY IMPAIRING TOLEROGENEICITY OF LIVER SINUSOIDAL ENDOTHELIAL CELLS

Takashi Onoe¹, Shinji Hashimoto², Yuka Tanaka² and Hideki Ohdan²

¹National Hospital Organization Kure Medical Center/Chugoku Cancer Center, Japan; ²Applied Life Sciences, Institute of Biomedical and Health Sciences, Hiroshima University, Hiroshima, Japan

Introduction: It has been recently reported portal vein pressure (PVP) influences survival of patients in liver transplantation, although the immunological aspect is unclear. In this study, we investigated the immunological impact of PVP after living-donor liver transplantation (LDLT).

Method: We analyzed postoperative anti-donor response of consecutive 166 LDLT patients based on the level of PVP ($<$ or ≥ 15 mmHg) at the end of surgery using matched-pair method. Further, to investigate the mechanism, we developed a 70% hepatectomized mouse model with portal hypertension. Three days after hepatectomy, digested whole hepatic constituent cells of mice were co-cultured with allogeneic splenocytes, and allo-immune of T-cells was quantified.

Results: Mixed-lymphocytes reaction assay (MLR) revealed that the high PVP group had a significantly higher anti-donor response than the low PVP group, at 2 weeks after LDLT. In addition, acute rejection episodes within 3 months were significantly higher in the high PVP group.

In mouse model, accelerated anti-allogeneic response was induced in hepatectomized mice. However, this accelerated response was significantly reduced in hepatectomized mice with a shunt. Interestingly, liver sinusoidal endothelial cells (LSECs), which suppress allogeneic T cells via antigen presentation, significantly down-regulated their MHC class II expression and suppressive function in hepatectomized mice.

Based on these result, we introduced continuous portal infusion of PGE1 to five LDLT patients with small-for-size graft (SFSG, GRWR $< 0.7\%$) for portal decompression so far. The PGE1 patients demonstrated significantly lower postoperative PVP compared with eight non-PGE1 patients with SFSG as historical control. Furthermore, MLR revealed that the PGE1 patients with SFSG showed well-suppressed anti-donor responses and better survival compared with the non-PGE1 patients with SFSG after LDLT.

Conclusions: This is the first study to prove that postoperative portal hypertension accelerates anti-donor responses in recipients after LDLT. Our findings present a novel concept for preventing the acceleration of anti-donor responses by controlling PVP after LDLT.

PO18-05

MATHEMATICAL MODEL OF LIVER REGENERATION IN HUMAN LIVE LIVER DONORS

Cataldo Doria and Vipul Periwal

Thomas Jefferson University Hospital, USA

Introduction: Liver regeneration after injury occurs in many mammals. Rat liver regenerates after partial hepatectomy over a period of 2 weeks while human liver regeneration takes several months. Notwithstanding this enormous difference in time-scales, with new data from five human live liver transplant donors, we show that a mathematical model of rat liver regeneration can be transferred to human with little change.

Method: The rat model consists of two interacting modules of ten ordinary differential equations, seven describing molecular interactions and three for the phenomenological cell cycle. The human model has the same molecular module as the rat model. The changes are all in the human phenomenological cell cycle module relative to the rat model. Only six phenomenological parameters need change, and three of these parameter changes are rescalings of rate constants by the ratio of human lifespan to rat lifespan.

Results: Data from three donor subjects with approximately equal resections were used to fit the three parameters and the data from the other two donor subjects was used to independently verify the fit.

Conclusions: This model has the potential to become a better predictor of liver regeneration after live liver donation or major hepatectomies

PO19-01

SAFE AND ADEQUATE DIVISION POINT OF LEFT BILE DUCT DURING LEFT LATERAL DONOR HEPATECTOMY

YoungRok Choi, Kwang-Woong Lee, Hyeyoung Kim, Tae Yoo, Suk-Won Suh, Nam-Joon Yi and Kyung-Suk Suh

Seoul National University Hospital, Korea

Introduction: To evaluate the risk for multiple bile ducts (BD) openings according to BD type and suggest the safe and adequate division point of BD during left lateral donor hepatectomy.

Method:

1) Multiple openings according to BD type: 43 grafts and the number of its BD openings after left lateral living donor hepatectomy from January 2004 to January 2011 were investigated. And Left BD of the donors was classified into three types; Type I ($n = 27$): B4 enters the common trunk of B2 and B3, Type II ($n = 12$): B2 joins the common channel of B3 and B4 and Type III ($n = 3$): tri-confluence of B2, B3, and B4.

2) The risk analysis by the potential division point of left BD: The chance for right BD injury and the risk for multiple openings during left lateral sectionectomy were analyzed by the potential division points with the pre-operative MR images of another 99 living donors between January 2012 and December 2012.

Results:

1) The risk of multiple BD openings: Four grafts with BD type II (33.3%), two grafts with type I (7.4%) had multiple BD openings. And no case of multiple openings in BD type III.

2) The division point that has both low chance for right BD injury and low risk for multiple openings

Optimal division point was 5 mm right away from the right border of umbilical portion of PV (U) in type I, 8 mm in type II and 12 mm in type III. But, a division point, where the possibility of injury for donor's right BD is less than 5%, was located within 5 mm from U.

Conclusions: Optimal division point can be suggested, but considering safety of donor's BD, it is better to divide the left BD within 5 mm the right border of the umbilical portion of left portal vein.

PO19-02

LIVER TRANSPLANTATION WITH MODIFIED CAVOPORTAL HEMITRANSPOSITION IN JAK 2 MUTATION FOR BUDD-CHIARI SYNDROME COMPLICATED BY THROMBOSIS OF THE PORTAL-VEIN SYSTEM. LONG TERM FOLLOW UP

Francesco D'amico, Alessandra Bertacco, Alessandro Vitale, Domenico Bassi, Enrico Gringeri, Daniele Neri, Giacomo Zanusi, Patrizia Boccagni and Umberto Cillo
HPB and Liver Transplant Unit Padova University, Italy

Introduction: Combined thrombosis of the inferior vena cava and portal-venous system is a rare and severe type of Budd Chiari syndrome. This combined thrombosis can involve both venous systems to a varying extent and can be either acute or chronic in nature. It is world wide accepted in the acute forms the use of liver transplantation with cavoportal hemitransposition as life-saving procedure or multivisceral transplantation.

Method: In this study, the authors describe a case of chronic myeloproliferative syndrome associated to JAK 2 mutation determining acute liver failure due to combined thrombosis of the inferior vena cava and portal-venous system undergoing to liver transplantation. The authors perform also a systematic review of the literature on PUBMED.

Results: This case was a 38 year-old woman, diagnosed with portal vein and spleno-superior mesenteric vein thrombosis. She was successfully treated using an in situ split right graft and a modified Tzakis' hemitransposition technique (with also porta-portal end to side anastomosis). In particular, we restored the outflow of the portal and mesenteric veins by using Urokinases bolus in recipient portal vein, and after we performed an end to side anastomosis on portal vein of the donor. The pre and post-transplant drug therapy was made with Oncocarbide and low molecular weight heparin. The bone marrow biopsy made 12 months after Liver transplantation evidenced an idiopathic myelofibrosis with normal blood tests. This patient is alive with functioning graft after 18 months from the transplant (09/

17/11). No bleeding from esophagus varices, no ascites, no limb edema and no portal thrombosis has been observed.

Conclusions: In our systematic literature review we found only seven cases of cavoportal hemitransposition for the simultaneous thrombosis of the caval and portal systems due to Budd Chiari syndrome. However, this is the first case using such a modified technique in this specific context.

PO19-03

IMPACT OF RECONSTRUCTING SINGLE HEPATIC ARTERY WITH TWO ARTERIAL STUMPS ON THE INCIDENCE OF BILIARY COMPLICATIONS IN PEDIATRIC LIVING DONOR LIVER TRANSPLANTATION

Karan Julka¹, Chih-Chi Wang¹, Chao-Long Chen¹, Bhavin Vasavada¹ and Yu-Fan Cheng²

¹*Kaohsiung Chung Gung memorial hospital, India;*

²*Kaohsiung Chang Gung Memorial Hospital, Taiwan*

Introduction: Hepatic artery (HA) reconstruction is one of the most challenging procedures when performing living donor liver transplantation (LDLT), especially in pediatric patients. HA thrombosis is the most feared complications of all. The size discrepancy and presence of multiple HAs makes HA reconstruction technically even more demanding. We herein report the impact of reconstruction single HA on the incidence of biliary strictures in pediatric patients undergoing LDLT.

Method: From 2002 to 2010, a total of 103 pediatric patients underwent LDLT in Kaohsiung Chung Gung Memorial Hospital. All the data were collected prospectively. The study group was divided in three groups. Group 1 (n = 21): 2 HA stumps with two HAs reconstruction, Group 2 (n = 22): two HA stumps with one HA reconstruction and Group 3 (n = 60): 1 HA stump with one HA reconstruction. All the HA reconstructions were done using operating microsurgical techniques. The criterion for reconstructing only one of the two was presence of good blood backflow and intra-operative arterial Doppler findings. The incidence of hepatic artery related complications, biliary complications and patient survival were compared between the three groups.

Results: Except for the duration of surgery which was more in Group 1 as compared to Groups 2 and 3 (p = 0.01), all the other variables were comparable. The incidence of HA thrombosis (p = 0.91) and biliary complications (p = 0.24) were similar in all the 3 groups. There was no significant difference in patient survival and biliary stricture free survival among the three groups.

Conclusions: Reconstructing single HA does not have an impact on the incidence of biliary strictures in pediatric living donor liver transplantation with two arterial stumps in the liver graft.

PO19-04

EFFECTIVENESS OF LOW-PRESSURE HIGH-VOLUME GRAFT INFUSION METHOD FOR RAPID AND COMPLETE WASHING OUT OF BLOOD FROM LIVING-DONOR RIGHT LIVER GRAFTS

Yohan Park and Shin Hwang

Asan Medical Center, Ulsan University, Korea

Introduction: To verify the effectiveness of the Effectiveness of low-pressure high-volume graft infusion method for right liver graft perfusion at the back table.

Method: In this prospective triple-arm study, first two groups each consisting of 20 right liver grafts underwent conventional graft perfusion using slow perfusate dripping using a small-caliber tube or semi-gravitational infusion method that involved gentle spoid dripping, and the third group used a large-caliber tube for 10 right liver grafts. These three graft perfusion methods were compared in terms of the perfusion time and washing-out efficiency.

Results: The spoid and large-caliber tube groups had a shorter graft portal perfusion time for the first 2 L of histidine-tryptophan-ketoglutarate solution than the conventional group (5 ± 2 min. and 5 ± 1 min., respectively; vs. 11 ± 1 min.; $p < 0.001$) and a lower rate of incomplete blood washing-out after the initial portal perfusion (56% and 58%, respectively; vs. 92%; $p < 0.001$). For ABO-incompatible grafts, fewer than 10 minutes were needed to perfuse the first 3 L of perfusate in the spoid and large-caliber tube groups; a much longer time was required in the small-caliber tube group.

Conclusions: The low-pressure high-flow infusion method using a surgical spoid or large-caliber tube appears to be more effective than the conventional slow perfusate dripping method for right liver graft perfusion at the back table.

PO19-05

DIFFERENT SURGICAL STRATEGIES FOR THE MANAGEMENT OF HEPATIC VEINS ANOMALIES DURING LAPAROSCOPIC LEFT LIVER SECTIONECTOMY FOR PEDIATRIC LIVING RELATED LIVER TRANSPLANTATION

Marco Spada¹, Ugo Boggi², Duilio Pagano¹, Sergio Li Petri¹, Davide Cintonio¹, Calogero Ricotta¹, Pasquale Bonsignore¹, Salvatore Gruttadauria¹ and Silvia Riva¹
¹ISMETT UPMC Italy; ²Azienda Ospedaliera-Universitaria Pisana, Pisa, Italy

Introduction: Laparoscopic left lateral sectionectomy (LLLS) is more and more adopted and has been proposed as the gold standard procedure for pediatric living donor liver transplantation.

Method: Between 2010–2012 we performed eight consecutive LLLS. Donors were 30 ± 7 years-old, with body weight and BMI of 69 ± 18 kg and of 24.1 ± 3.7 , respectively. Four donors presented left hepatic vein (LHV) anomalies: common trunk draining

the middle (MHV) and the LHV into the vena cava ($n = 1$); accessory hepatic vein draining the fourth segment, located along the hypothetical plane of section ($n = 1$); communicating trunk between the LHV and MHV ($n = 1$); separate confluence of segment two and three LHV into the MHV ($n = 1$). We also report two LHV anomalies that draining into a single and very short common trunk before the entrance into the inferior vena cava ($n = 1$).

Results: Length of procedures was 417.4 ± 57.4 min. and the operation time have been decreased with the increasing of the procedures: in the subgroup of donors with LHV anomalies the operational length was 392.25 ± 62.7 min. versus 443 ± 56.6 min. in the donors without anomalies ($p = 0.27$). The total ischemia time was 40.2 ± 7.2 and the intra-abdominal warm ischemia time was 5.5 ± 1 min: in LHV anomalies subgroup it was 36.75 ± 7.9 min., versus. 43.75 ± 6.5 min. in donors without anomalies ($p = 0.22$). The total liver volume was 1485.4 ± 239.5 cc with a graft volume of 280.8 ± 113.44 cc. The donors did not require intensive care unit statement. No caval complications were experienced. All of the donors were discharged between 4–6 days after the operation. About the recipients, there were no hepatic vein outflow complications, nor arterial strictures or thrombosis, but just only one case developed portal vein thrombosis that did not required any surgical procedures to be corrected. All of the recipients were discharged between 15–20 days and actually are alive and well.

Conclusions: The venous outflow requirements apply as well when anatomic anomalies are present in the setting of minimally-invasive approaches for living-related liver donations.

PO20-01

AUXILIARY PARTIAL ORTHOTOPIC LIVER TRANSPLANTATION IN MICE

Qi Cheng and Xiao-ping Chen

Tongji hospital, China

Introduction: Auxiliary partial orthotopic liver transplantation (APOLT) is a good alternative treatment in cases of fulminant liver failure and metabolic liver disorders.

Method: Here, we describe on a surgical technique for APOLT and our experience with this model. In brief, the donor portal vein and hepatic vein are anastomosed with a cuff and suture technique, respectively, while the donor bile duct is implanted into recipient duodenum.

Results: For the whole process, the anhepatic phase is only 5–7mins. The APOLT model we describe is reliable, with an 85% (17/20) survival at 2 weeks postoperatively. This is the first description of a mouse model of APOLT.

Conclusions: Compared with orthotopic liver transplantation, an advantage of this model is that the donor liver and remnant liver are simultaneous. With the availability of gene-modified mouse strains and mouse-specific reagents, this model will allow expanded research and into mechanisms of liver regeneration and transplantation immunity.

PO20-02

RESULT OF EXTRACORPOREAL MEMBRANE OXYGENATION (ECMO) SUPPORT IN CARDIAC ARREST OF THE LIVER TRANSPLANTATION RECIPIENTS

Jeong-Moo Lee, Nam-Joon Yi, Youngrok Choi, Suk-Won Suh, Tae You, Jose Benjamin Navarro Burgos, Angelica Garcia, Kwang-Woong Lee and Kyung-Suk Suh

Seoul National University Hospital, Korea

Introduction: Recipients of the liver transplantation have many risk factors for the operation. Intraoperative bleeding due to underlying coagulopathy, thrombocytopenia can increase hemodynamic instability, and procedures during the operation like IVC clamping, reperfusion after anastomosis also affect. These conditions can cause some cardiac problems, even cardiac arrest during the transplantation. We present 3 cases of survivor after cardiac arrest, and discuss usefulness of ECMO in this situation.

Method: We reviewed three cases of survivor after cardiac arrest in 403 cases of living donor liver transplantation from March 2009 to March 2013.

Results: All patients were male and had no previous cardiac problems. One case had Non B, non C liver cirrhosis and two cases had hepatitis B related liver cirrhosis. In all three cases, cardiac arrest was happened but there is no definite reason. We inserted ECMO in two cases intraoperative period and postoperative 1-day after transplantation in one case. After ECMO was inserted, vital sign was recovered immediately, but acute pulmonary edema was found in chest x-ray. We checked daily echocardiography at immediate postoperative period in all patients. After checking recovery of chest x-ray, we weaned ECMO. Cardiac output also recovered and there is no cardiac complication after weaning of ECMO. Finally, two cases had no serious postoperative complication, one case had cerebral infarction after cardiac resuscitation, but liver function was normal and all patients survive now.

Conclusions: Immediate ECMO application could be useful in the cardiac arrest in liver transplantation.

PO20-03

RESULTS OF LIVER TRANSPLANTATION DURING PREGNANCY DUE TO FULMINANT HEPATIC FAILURE

Felipe León, Juan F Guerra, Jean P Bächler, José L Galindo, Alejandro Rojas, Carlos Benítez, Marco Arrese, Rosa M Pérez-Ayuso, Nicolás Jarufe and Jorge Martínez

Pontificia Universidad Católica de Chile, Chile

Introduction: Fulminant hepatic failure (FHF) during pregnancy represents an unusual life-threatening condition. In this setting, liver transplantation (LT) is a life-saving procedure. Few cases have been reported, with dissimilar maternal and fetal outcomes. The aim of this

study is to present our experience in LT during pregnancy due to FHF in four cases.

Method: A retrospective analysis of our LT database was performed, between 1994 and 2013. Demographic and perioperative data, recipient (maternal) and fetal outcomes were analyzed.

Results: During this period, 188 LT were performed, 30 due to FHF. Four pregnant women underwent a LT during pregnancy. The median of age was 31 years (range, 16–35) and gestational age (GA) at the time of transplant was 25 weeks (range, 21–26). Etiologic work-up including viruses, auto-immunity, drugs and others was negative in all but 1 case (B-19 parvovirus infection). All patients were transplanted. One patient presented progression of brain edema and died 3 days after surgery, with multi-organ failure. One patient presented a primary non-function, requiring emergent re-transplantation on POD5. Regarding to fetal outcomes, three patients required a caesarian section: one at 26 weeks of gestation, immediately before LT due to obstetric reasons, one required fetal extraction during the transplant due to severe fetal bradycardia and the other one seven weeks after the transplant (27 weeks GA) due to non-controllable labor. The remaining patient had an abortion on POD1 (20 weeks GA). One newborn had neurological deficit due to intracranial hemorrhage and the others two exhibited normal postnatal courses, achieving normal developmental milestones. At long-term follow-up, the three survivor recipients have excellent liver graft function with no others complications.

Conclusions: Liver transplant due to FHF during the pregnancy is challenging. Despite of that, favorable maternal and fetal outcomes can be achieve when it success. A multidisciplinary team is essential in the management of these patients.

PO20-04

THE IMPACT OF BLOOD TRANSFUSION ON THE INCIDENCE OF REJECTION IN ORTHOTOPIC LIVER TRANSPLANTATION

Marieke TDe Boer, Aad P Van den Berg, Ton Lisman, Herman GD Hendriks and Robert J Porte

University Medical center Groningen, Netherlands

Introduction: Improvements in anesthesiological and surgical techniques have lead to a decrease in the use of blood products during liver transplantation (LT). Nowadays several centers describe series of patients who were transplanted without intraoperative blood transfusion. Blood transfusion is generally considered to be harmful, although in kidney transplantation early reports have suggested a protective effect of RBC transfusion on the incidence of rejection after kidney transplantation. Aim of our study was to determine whether RBC transfusion has a protective effect against rejection in LT.

Method: Between 1995 and 2004, 292 primary liver transplantations in adults were performed. Specific reason to select this decade is that at that time it was our policy to perform a routine liver biopsy within 2 weeks after LT, if the clinical condition would allow this. This policy was abandoned after 2004. All patients who

underwent a biopsy within 2 weeks were included. Patients who died or were retransplanted <7 days after LT were excluded. Recipient and donor parameters and intraoperative transfusion requirements were available in a prospectively collected database. Uni- and multivariate analysis was performed to determine the risk factors for histological graft rejection.

Results: In total, 197 patients had a biopsy within 2 weeks after OLT. Median age was 49 years, 57% of recipients was male, median MELD score was 16. Fifty nine (30%) patients did not receive any RBC transfusion during LT. After uni- and multivariate analysis the following variables were found to be independently associated with acute rejection (any Banff grade): RBC transfusion intraoperative (OR 2.811, 95% CI 1.258–6.280, p-value 0.012), and induction immunosuppression (OR 2.061, 95% CI 1.085–3.915, p-value 0.027).

Conclusions: This study shows that there is an increased risk of developing acute rejection after LT when patients do not receive any RBC transfusion during LT.

PO20-05

HISTOLOGICALLY PROVEN NONALCOHOLIC FATTY LIVER DISEASE AND CLINICALLY RELATED FACTORS IN RECIPIENTS AFTER LIVER TRANSPLANTATION

Hyeyoung Kim, KyoungBun Lee, Kwang-Woong Lee, Nam-Joon Yi, Hae Won Lee, YoungRok Choi, Suk-Won Suh, Tae You and Kyung-Suk Suh
Seoul National University College of Medicine, Korea

Introduction: Nonalcoholic fatty liver disease (NAFLD) affects a substantial proportion of the general population in the world, and its prevalence has been increasing. However, little is known about NAFLD in liver transplantation (LT) recipients. The study was aimed at evaluating the prevalence of NAFLD and peri-transplant risk factors for post-LT NAFLD.

Method: A retrospective review was performed for adult recipients who underwent late protocol liver biopsy (>1 year after LT) at our institution between August 2010 and December 2012. Hepatic steatosis was reviewed and graded by hepatic pathologists. The peri-transplant factors were analyzed for relationships to histologically proven NAFLD.

Results: Total 166 liver biopsies had been performed in 156 adult recipients. NAFLD (micro and macrovesicular lipid accumulations of more than 5%) were present in 27.1% of cases at a mean period of 35.4 months between LT and biopsy, moderate and severe steatosis ($\geq 33\%$) consisted of 28.9%. In multivariate analysis, pre-LT alcoholic cirrhosis (odds ratio [OR] 8.031, $p = 0.003$), obesity at biopsy (OR 3.873, $p = 0.001$), and pre-existing donor graft steatosis (OR 3.147, $p = 0.022$) were significant risk factors for post-LT NAFLD. NASH (NAFLD activity score ≥ 5) was present in 8.9%, and metabolic syndrome in 26.7% of the steatosis group.

Conclusions: NAFLD represented a considerable portion of liver transplant recipients, but this prevalence was not higher than those reported for general popula-

tions. Risk factors such as pre-LT alcoholic cirrhosis, obesity at biopsy, and pre-existing donor graft steatosis were significantly related to histologically proven NAFLD after LT. Post-LT recipients with these risk factors should be monitored for NAFLD. Furthermore, possible progression to NASH or fibrosis and metabolic syndrome should be considered in future studies.

PO21-01

STEREOTACTIC BODY RADIOTHERAPY USING ONLINE FOUR-DIMENSIONAL IMAGE- GUIDANCE FOR INOPERABLE PRIMARY LIVER CANCER OR HEPATIC METASTASES

Wenchang Wong¹, Koroush S Haghighi² and David Goldstein¹

¹Prince of Wales Hospital, Australia; ²UNSW, Australia

Introduction: Curative resection of primary liver cancer and hepatic oligometastatic disease may not always be possible due to patient and disease factors. Biological dose escalation through stereotactic body radiotherapy (SBRT) is emerging as a treatment option to achieve long term control and potentially cure for those patients who are not surgical candidates.

Method: We present our case series of patients who underwent this novel approach using four-dimensional (4D) image-guided SBRT to account for respiratory motion. The dose delivered was 40 Gy in five fractions, treated second daily on a standard linear accelerator. The malignancies treated include hepatocellular carcinoma (HCC), cholangiocarcinoma and solitary metastatic colorectal cancer to the liver. Patients were of Eastern Cooperative Oncology Group (ECOG) performance status 0 or 1.

Results: As of August 2013, we have observed 100% response rate to SBRT in our sample pilot group ($n = 4$) based on progress CT scans and PET/CT scans. Follow-up was between 3–18 months. Patients were aged between 23 and 75 years. The size of the lesions ranged from 3 cm to 9 cm and one patient had multifocal recurrent hepatocellular carcinoma. Reasons for inoperability include medical comorbidities and locally advanced disease. For example, a patient with a 3 cm HCC was in Child-Pugh class C category. Another patient had a solitary 9 cm \times 8 cm colorectal carcinoma metastasis involving segment eight of the liver and was not resectable as the mass had invaded through the diaphragm and involved the right lower lobe of the lung. Apart from mild fatigue and nausea, acute radiotherapy toxicity was rarely seen. Late toxicities have not been observed. Normalisation of tumour markers such as alpha-fetoprotein (AFP) and carcinoembryonic antigen (CEA) were also seen post-treatment.

Conclusions: This novel technique employing 4D image-guided SBRT is feasible and well tolerated with minimal side effects. It provides long term local control of inoperable lesions.

PO21-02

ANATOMICAL HEPATECTOMY USING ICG NAVIGATION SYSTEM

Shinya Hayami, Masaki Ueno, Yoshinobu Shigekawa, Shunsuke Yamaguchi, Masaji Tani, Manabu Kawai, Seiko Hirono, Ken-ichi Okada, Motoki Miyazawa and Hiroki Yamaue

Wakayama Medical University, Japan

Introduction: In performing hepatectomy for hepatocellular carcinoma, anatomical resection is desirable to control intrahepatic metastasis or to reduce postoperative complications. Recently, near-infrared fluorescence (NIRF) imaging under indocyanine green (ICG) injection and contrast enhancement intraoperative ultrasonography (CEIOUS) were provided and progressed the intraoperative imaging diagnosis. Using advantages of these techniques, we aimed to develop a novel navigation system for anatomical liver resection.

Method: Previously, 22 HCC patients underwent anatomical hepatectomy using this navigation system (lobectomy (n = 4), segmentectomy (n = 6), sub-segmentectomy (n = 12)). Navigation of anatomical liver resection was performed as follows: 1) under ligation of the glissonian pedicle where flows the planned liver resection area, ICG was intravenously injected and observed the demarcation area using NIRF imaging system (PDE, Hamamatsu photonics, Japan) (counter perfusion method). 2) Immediately after ultrasound guided injection of ICG to the glissonian pedicle where flows the planned liver resection area, NIRF image was observed (direct perfusion method).

Results: The planned resection area was detected clearly as a non-fluorescent area by the counter perfusion method (Figure 1) and as a fluorescent area by the direct perfusion method (Figure 2). The resection volume was statistically correlated with the estimated volume by 3D-CT volume analysis. There were no adverse effects related to our new navigation system.

Conclusions: We demonstrated here that the navigation system using NIRF imaging is a novel and reliable technique for anatomical hepatic parenchyma resection.

PO21-03

CLASSICAL VERSUS ROBOT-ASSISTED LAPAROSCOPIC LIVER RESECTION: A MATCHED-PAIR COMPARATIVE STUDY

Hadrien Tranchart¹, Cecillia Ceribelli¹, Alberto Patiritti² and Ibrahim Dagher¹

¹*Antoine Bécélère Hospital, France;* ²*San Matteo degli Infermi Hospital-Spoleto, Italy*

Introduction: Only a few series have demonstrated the safety of robot-assisted laparoscopic liver resection (RLLR) and the benefits of this approach. This report describes the results of a pair-matched comparative study between classical laparoscopic liver resection (CLLR) and RLLR performed in two European surgical centers.

Method: Patients were retrospectively matched in pairs for the following criteria: sex, age, severity of liver dis-

ease, tumor size, type of liver tumor and type of resection. A total of 28 patients undergoing RLLR were compared with patients undergoing CLLR during the same period. Operative and postoperative outcomes were compared.

Results: The mean duration of surgery was similar in the two groups (p = 0.15). Despite matching more tumors were localized in posterior segments (IVa, VII, VIII and I) in the RLLR group (39.3% vs. 10.7%; p = 0.008). Conversion rate was superior in the RLLR group (14.3 vs. 7.1%; p < 0.0001). Mean blood loss was similar in the two groups (p = 0.56). Transfusion was required for four patients (14.3%) in the RLLR group and one patient (3.6%) in the CLLR group (p < 0.0001). Global morbidity was inferior in the RLLR group (17.8 vs. 21.4%; p = 0.02). Mortality was nil in both groups. Mean hospital stay was similar in the two groups (p = 0.68).

Conclusions: In selected patients, RLLR could lead to a lower morbidity rate. However this approach seems to be associated with a more important conversion rate compared with the CLLR.

PO21-04

IPAD GUIDED RIGHT HEMIHEPATECTOMY WITH A NEW APPLICATION DESIGNED SPECIFICALLY FOR NAVIGATION SURGERY: INITIALLY CLINICAL EXPERIENCE FOR PERIHILAR CHOLANGIOCARCINOMA

Ryusei Matsuyama¹, Ryutaro Mori¹, Koichi Taniguchi¹, Kazunori Nojiri¹, Seigo Hiratani¹, Kazuhisa Takeda¹, Kuniya Tanaka¹, Alexander Köhn², Andrea Schenk² and Itaru Endo¹

¹*Yokohama City University, Japan;* ²*Fraunhofer, Germany*

Introduction: Liver has complicated and variable anatomy of the hepatic vein, portal vein and hepatic artery. Precise anatomical understanding for liver is necessary for curative and safe hepatectomy. We have reported the utility of 3D-CT image in hepatobiliary surgery. We herein report a new iPad application designed specifically for liver surgery using augmented reality (AR) technology.

Method: 11 patients with perihilar cholangiocarcinoma who underwent right hemihepatectomy with caudate lobectomy between November 2012 and August 2013 were enrolled in this study. The 3D reconstructed triadgraphy was obtained from preoperative computed tomography data. A new iPad application "Mobile Liver Explore" offers the possibility to check detailed anatomical information in the operative field by fingertip and confirm surgical plan. An AR mode enables an overlay of the camera view of the liver with the 3D vascular image (hepatic artery, portal vein, hepatic vein, and bile duct). We check the branches of middle hepatic vein and marking it to the liver surface under an augmented reality mode.

Results: All eleven patients were performed hepatectomy safely with iPad guided. Ten of eleven patients

were performed combined resection of portal vein and reconstruction. Mean time of operation was 681.5 min. and mean time of hepatectomy was 45.9 min. Mean blood loss in hepatectomy was 227.1 mL. Only 3 of eleven patients required a RCC transfusion. Morbidity occurred in only two of eleven patients (Clavien-Dindo Grade III<, abdominal abscess).

Conclusions: iPad with specialized AR application seem to be suitable for clinical use in open liver navigation surgery. Intraoperative demonstration of branches of hepatic vein may improve the safety and accuracy of operations.

PO21-05

USABILITY OF 3-DIMENSIONAL VIRTUAL RECONSTRUCTION SOFTWARE (DR. LIVER) FOR PRE- AND INTRAOPERATIVE DETERMINATION OF LIVING DONOR LIVER TRANSECTION AND VASCULAR RECONSTRUCTION

Wanjoon Kim, Shin Hwang, Gi-Won Song, Tae-Yong Ha, Dong-Hwan Jung, Hee-Chul Yu, Hee-Cheon Yu and Sung-Gyu Lee

Asan Medical Center, Ulsan University, Korea

Introduction: In living donor liver transplantation, accurate assessments of liver graft volume and anatomical variation are mandatory for the preoperative planning of safe donor hepatectomy and successful recipient implantation. The aim of this study was to assess the usability and accuracy of 3-dimensional virtual reconstruction software in living-donor liver transplantation.

Method: We used commercial 3-dimensional virtual reconstruction software, 'Dr. Liver' for preoperative evaluation of living donor anatomy and volumetrics by using computed tomography images in consecutive 50 cases of adult living donor liver transplantation. The predicted liver resection volumes revealed a significant correlation with the conventional manual volumetry and the actual value (all $p < 0.01$). The drainage area by the individual branches of the middle, right and inferior right hepatic veins was quantified to achieve reconstruction of the corresponding venous branch. This 3-dimensional virtual reconstruction software reliably predicted accurate liver graft volume and the drainage volume of hepatic vein branches.

Results: This software may contribute to the preoperative planning of safe donor hepatectomy and implantation with satisfactory graft viability. Accurate preoperative assessments of hepatic volumetrics are needed for surgeons to risk stratify and properly select patients for major hepatic resections including donor hepatectomy.

Conclusions: The software 'Dr. liver', which was developed by Korean liver surgeons, represents a reliable step towards a greater accuracy in hepatic volumetrics and improved safety in liver surgery.

PO22-01

SURGICAL TREATMENTS OF 3151 HCC PATIENTS IN THREE DECADES; THE CHANGE OF TREATMENT PLAN AND OUTCOME ANALYSIS

Ming-Chin Yu, Chao-Wei Lee, Yann-Sheng Lin, Wei-Chen Lee, Miin-Fu Chen and Kun Ming

Chang Gung memorial hospital, Linkou branch, Taiwan

Introduction: HCC were always an important health issue in Taiwan. The change of surgical planning was seldom presented. Here we offered a single experience of HCC in northern Taiwan medical center.

Method: Of 3151 HCC patients from 1983 to 2012, three cohorts were grouped in decades: 187, 1293, and 1671 were collected in era 1, 2, and 3 respectively. The data were analyzed with AJCC staging system and 4.1, 49.5, 18.4, 5.1, 7.4, and 2.2% were stage I, II, IIIA, IIIB, IIIC, and IV, respectively. The overall complication rate was 21.8% and surgical mortality rate was 4.8%.

Results: The patients selection were change in the decades; less patients were HBV positive, less Child B or C status, less tumor rupture, less vascular invasion, less satellite nodules. The tumor size was also decreased ($p < 0.05$). The presence of cirrhosis is 50%. The disease free and overall survival at 5 and 15 years were 51.8% and 36.6%, 25.8% and 23.7% respectively. The surgical outcome was significantly improved at era 3 by stage I and IIIB. Treatment of postoperative recurrence was improved by TACE.

Conclusions: The data showed surgical treatment still had important role in HCC. To improve long-term outcome, delicate surgical technique, detailed anatomy concept in transection, and aggressive recurrence treatment should be addressed.

PO22-02

PREDICTION OF HEPATOCELLULAR CARCINOMA RECURRENCE FOLLOWING HEPATECTOMY BASED ON OPERATIVE FACTORS AND TUMOR CHARACTERISTICS

Shozo Mori, Junji Kita, Takayuki Shiraki, Masato Kato, Mitsugi Shimoda and Keiichi Kubota

Dokkyo Medical University, Japan

Introduction: Recurrence of hepatocellular carcinoma (HCC) occurs at high rates, resulting in dismal outcomes, despite curative liver resection (LR). Therefore, establishment of a simple and useful predictive model of recurrence would help improve survival rates.

Method: A total of 438 patients with HCC who underwent LR as the initial curative treatment were enrolled between April 2000 and March 2012. The preoperative, operative, and pathological variables of these patients were analyzed to generate a predictive model of recurrence after LR.

Results: HCC recurred in 285 (65%) patients. Univariate analysis showed that 10 independent factors affected recurrence and could be used as predictive measures. Further, a prediction formula for recurrence

based on the results of multivariate discriminant analysis was established: $D = 0.517$ (outside the Milan criteria) + 0.564 (alpha-fetoprotein > 10 ng/mL) + 0.349 (non-anatomical LR) + 0.431 (blood loss > 240 mL). By applying this formula, patients were categorized into low-, standard-, and high-risk groups (Groups 1, 2, and 3, respectively). Two of 18 patients (11%) in Group 1, 135 of 224 (60%) in Group 2, and 148 of 196 (76%) in Group 3 developed HCC recurrence. Accordingly, this formula had a discrimination rate of 64% for predicting the development of recurrence. One- and five-year recurrence rates were 6% and 14% in Group 1, 20% and 64% in Group 2, and 41% and 89% in Group 3, respectively ($p < 0.001$, log-rank test).

Conclusions: We developed a model for predicting HCC recurrence during the follow-up period after LR based on operative factors and tumor characteristics. This model clearly discriminated those patients with an elevated risk of recurrence, who would require additional monitoring during postoperative care.

PO22-03

IMPACT OF THE MACROSCOPIC GROSS TYPE CLASSIFICATION FOR SMALL HEPATOCELLULAR CARCINOMA

Satoshi Katagiri, Shun-Ichi Ariizumi, Yoshihito Kotera, Yutaka Takahashi, Akiko Oomori, Shingo Yamashita, Godai Yoneda, Hirohito Egawa and Masakazu Yamamoto

Tokyo Women's Medical University, Japan

Introduction: In the recent years, the treatment options for Hepatocellular Carcinoma (HCC) less than 3 cm in diameter is selected the hepatectomy or the local ablation. We inquired paying attention to the macroscopic gross type of surgical specimens for small HCC.

Method: We enrolled 942 naïve patients with HCC less than 3 cm in diameter who were treated with hepatectomy at our hospital between 1986 and 2011. Statistical analysis was made of the histopathological evidence of portal and hepatic vein invasion, intrahepatic metastasis and cumulative and disease-free survival rates by the macroscopic gross type of the general rules for the clinical and pathological study of primary liver cancer from Liver Cancer Study Group of Japan. The macroscopic gross type is classified into five types, small nodular type with indistinct margin (SNIM), simple nodular type (SN), confluent multinodular type (CM), simple nodular type with extranodular growth (SNEG) and infiltrative type (IF).

Results: Of 942 patients with small HCC examined for the microscopic portal vein invasion of surgical specimens, 0, 9.2, 40.6, 28.5 and 32.1% had SNIM, SN, CM, SNEG and IF, respectively. For the macroscopic intrahepatic metastasis, 0, 8.3, 29.7, 30.2 and 14.3% had SNIM, SN, CM, SNEG and IF, respectively. Of 869 patients with curative resection, the 5-year survival rates were 77, 69, 71 and 61% in patients with SNIM, SN, CM and SNEG, respectively. The 5-year disease free survival rates were 41, 33, 36 and 27% in patients with SNIM, SN, CM and SNEG, respectively. There

were a significant difference between SNEG and other types in 5-year survival and disease free survival rate.

Conclusions: These results suggest the possibility that simple nodular type with extranodular growth of HCC less than 3 cm in diameter has a high grade of malignancy. The treatment to such type HCC requires cautions.

PO22-04

CLINICOPATHOLOGIC FEATURE AND PROGNOSIS OF COMBINED HEPATOCELLULAR-CHOLANGIOCARCINOMA WITH STEM CELL FEATURE

Hwakyung Jung, Sungsu Yoon, Dongshik Lee and Hongjin Kim

Yeungnam University Medical Center, Korea

Introduction: Combined hepatocellular-cholangiocarcinoma (cHCC-CC) is rare subtype of primary liver cancer, and generally the prognosis is known to be worse than HCC. The purposes of this study were to evaluate the clinicopathologic feature and prognosis of the cHCC-CC.

Method: From January 2000 to December 2012, 33 patients were diagnosed with cHCC-CC who underwent hepatectomy for liver malignancy. The clinicopathologic and follow-up data were evaluated retrospectively, and compared the data of HCC and ICC patient.

Results: 33(8.51%) patients of the 388 patients who were initially diagnosed with HCC were diagnosed with cHCC-CC after surgery from January 2000 to December 2012. Mean age was 57.85 ± 11.39 and Male:Female ratio was 20:13. Mean ICG R15 was $15.74 \pm 10.98\%$ and Child-Pugh class of all patients were A. 20 patients (60.6%) had HBV viral infection, 3 (9.1%) patients had HCV viral infection. 10 patients (30.3%) didn't have viral hepatitis. The mean value of preoperative serum-AFP was 4398.86 ± 14763.43 (1~77249). cHCC-CC was classified with 2010 WHO classification, 2 patients (6.1%) were classical subtype, 1 patient (3.0%) was typical subtype, 6 patients (18.2%) were intermediate type, 3 patients(9.1%) were cholangiolocellular type. 21 patients were unclassified. Lymph node metastasis was present in 4 patient (12.1%) and 2 patient (1%) for cHCC-CC and HCC, respectively. The cumulative 1, 3and 5 year disease-free survival rates after hepatectomy were 64.4%, 37.9%, and 0% in cHCC-CC patients, and 80.9%, 62.6%, 52.0% in HCC patients. The cumulative 1, 3 and 5 year survival rates were 72.1%, 46.5% and 31.0% in cHCC-CC patients, and 78.0%, 56.4%, 46.0% in HCC patients. But, after adjusted by stage, there was no significant difference in overall survival and disease-free survival.

Conclusions: cHCC-CC has a clear pattern of HCC, but it has also some aspect of CCC, such as lymph node metastasis. Survival difference may be related to higher rate of lymph node metastasis and advanced stage of cHCC-CC.

PO22-05

FACTORS AFFECTING THE OUTCOMES OF THE SURGICAL TREATMENT OF BREAST CANCER LIVER METASTASES

Vladislav Treska, Monika Cerna, Vaclav Liska, Tomas Skalicky and Ilona Zednikova

University Hospital, Medicine Faculty, Czech Republic

Introduction: The results of the surgical treatment of breast cancer liver metastases (BCLM) may be affected by a number of factors. The aim of this study was to specify the risk factors of the surgical treatment of BCLM.

Method: Twenty one female BCLM patients were treated with liver resection or radiofrequency ablation (RFA). We studied the effects of patients age, time interval between the breast cancer and BCLM surgery, the type of surgical procedure, histopathological findings of the primary tumor, the number and overall diameter of BCLMs, the presence of resectable extra-hepatic metastases, and local tumor recurrence after breast cancer surgery on patients' overall (OS) and progression-free survival (PFS).

Results: The long-term results did not differ between liver resection and RFA. Patient age <50 years and the interval between breast and liver surgery were risk factors for OS (HR 4.163, CI 1.146–15.118, $p < 0.02$; and HR 4.738, CI 1.287–17.441, $p < 0.01$, respectively) and for PFS (HR 4.303, CI 1.056–17.531, $p < 0.01$; and HR 5.088, CI 1.496–17.303, $p < 0.01$, respectively). The presence of extra-hepatic metastases was a risk factor for OS (HR 5.078, CI 1.437–17.949, $p < 0.005$). An overall diameter of BCLM ≥ 3.5 cm and a negative status of both ER and PR in the primary tumor were risk factors for PFS (HR 9.999, CI 1.257–79.513, $p < 0.009$; and HR 21.475, CI 1.907–241.843, $p < 0.0003$, respectively).

Conclusions: The risk factors for BCLM surgery are patient's age <50 years, the presence of extrahepatic metastases, hormone negative receptors in the primary tumor and an overall BCLM diameter ≥ 3.5 cm.

PO23-01

CLINICO-PATHOLOGICAL FEATURES AND SURVIVAL OUTCOMES OF BRCA1/2-ASSOCIATED PANCREATIC CANCERS: THE ONTARIO EXPERIENCE

Siong-Seng Liao¹, Emily Whelan², Hassan Shoushtari¹, Spring Holter², Kanji Zaheer², Serra Stefano¹, Mohammad Akbari³, Cleary Sean¹ and Gallinger Steven¹

¹Toronto General Hospital, Canada; ²Mount Sinai Hospital, Canada; ³University of Toronto, Canada

Introduction: Germline BRCA1/2 mutation carriers represent the most common subgroup of hereditary pancreatic cancer. BRCA1/2 mutations lead to impaired DNA damage repair and predispose to a 'mutator' phenotype in cancers. Hypothetically, the cumulative mutations are stochastic, leading to varying

tumour phenotype. This study aimed to analyze the baseline clinicopathologic characteristics of BRCA1/2-associated pancreatic cancers, and to explore possible differences in clinical outcomes.

Method: We reviewed the tumour characteristics and survival of 33 BRCA1/2 carrier patients with pancreatic adenocarcinoma (8 BRCA1, 25 BRCA2). All patients had sequence confirmation of germline BRCA1 and BRCA2 mutation status.

Results: The most common germline mutations were c.185delAG (38% of BRCA1 group) and c.6174delT (48% of BRCA2 group). BRCA1 and BRCA2 mutation carriers did not differ in age (62 ± 11 vs. 61 ± 12), symptomatology at diagnosis and other clinicopathologic features. BRCA1 carriers tended to be males of Jewish descent, and with a family history of pancreatic cancer. Surgical resectability rates were 37.5% and 32% for BRCA1 and BRCA2 carriers respectively. In the surgically resected group, the median survivals were 25.9 months and 31.1 months for BRCA1 and BRCA2 carrier patients, respectively. The actuarial 1-, 3- and 5-year survivals for the resected patients were 100%, 33.3% and 0% for BRCA1 carriers and 80%, 40% and 20% for BRCA2 carriers. For unresectable or metastatic disease, the median survivals for BRCA1 and BRCA2 were 15.9 months and 12.0 months respectively. A small group of outliers (12%; $n = 4/33$, 1BRCA1, 3BRCA2) were identified with longer survival (>3 years).

Conclusions: This series confirms the generally poor survival of BRCA1 and BRCA2 carriers with pancreatic cancer. There is heterogeneity in the survival outcomes with longer survival biased by a small group of outliers. This 'survival outlier' phenomenon may represent a biologically-distinct group with potential for longer survival and warrants further characterization.

PO23-02

RESECTION OF LOCALLY ADVANCED PANCREATIC CANCER AFTER NEOADJUVANT CHEMOTHERAPY WITH MODIFIED FOLFIRINOX: A PROSPECTIVE PHASE II STUDY

Enrico Vasile, Nelide De Lio, Mario Antonio Belluomini, Francesca Costa, Carla Cappelli, Daniela Campani, Alfredo Falcone and Ugo Boggi

University of Pisa, Italy

Introduction: Up to 30% of the patients diagnosed with pancreatic ductal adenocarcinoma (PDAC) are denied resection because of local tumor growth in the absence of metastasis. These patients could be still be considered for resection, if responsive to neoadjuvant chemotherapy (NACT). We report the results of a phase-II-clinical-trial, coupling high-dose-multi-drug-NACT with aggressive surgery.

Method: All patients enrolled were selected by a multi-disciplinary workgroup, when PDAC was staged as T4 (according to the UICC), ECOG PS was 0–1, and age was 18–75 years. A modified-FOLFIRINOX regimen was used. Tumor response was evaluated according to RECIST. The opportunity to add a local treatment,

either surgery or radiation-therapy, was evaluated after every CT follow-up.

Results: Between 11/2010–07/2013, 35 patients were enrolled: 9/35 celiac axis involvement, 18/35 superior mesenteric artery (SMA), 6/35 celiac axis and SMA. Fourteen patients had a partial response (40%), 19 stable disease, two progressed. Twenty-three patients were selected for surgical exploration, and 19 underwent potentially curative resection: four pancreaticoduodenectomy, 14 total-splenopancreatectomy, one distal splenopancreatectomy. Multivisceral resection was necessary in six patients. Seventeen patients needed resection of at least one peripancreatic vessel: superior mesenteric vein (SMV) in six patients, SMV plus SMA in 5 patients, and hepatic artery/celiac trunk plus SMV in four patients. Two patients required the simultaneous resection of three vessels. Mean-operative-time was 456.8 minutes. In-hospital-mortality was 4.3%, and overall-postoperative-morbidity 43.4%. Mean-hospital-stay was 16.4 days. 19/19 resections were R0. The mean number of examined lymph nodes was 72.3, and the mean number of positive nodes three. Quite interestingly, 75% of veins and 87.5% of SMA were tumor-free at pathology. Overall-progression-free-survival was 14 months, resected-patient-progression-free-survival 17.8 months, out-of-surgery-patient-progression-free-survival 10.3 months, median-overall-survival 24.2 months.

Conclusions: Modified-FOLFIRINOX protocol in T4 PDAC allows resection in a relevant percentage of patients, most of whom with histological downstaging, achieving survival results similar to primary-resectable-patients.

PO23-03

LONG AND SHORT TERM SURVIVAL AFTER PROXIMAL PANCREATIC RESECTION-EXPERIENCE OF A SINGLE UNIT

Andrew Healey, Sanjay Pandanaboyana, Mark Duxbury, R Ravindran, James Powell, Steve Wigmore, O. James Garden and Rowan Parks
Royal Infirmary of Edinburgh, United Kingdom

Introduction: Pancreatic resection has traditionally been associated with significant morbidity and mortality rates. Advances in pre-operative imaging, surgical technique and perioperative management in specialist units have reduced morbidity and mortality rates. The aim of this study was to assess the short and long-term outcome in patients undergoing major proximal pancreatic surgery in a tertiary referral unit.

Method: All patients undergoing a Whipple/PPPD procedure from 1988 to 2011 were reviewed. Survival data was obtained through the national Information Services Division of NHS Scotland. Survival data was processed as Kaplan Meier plots using GraphPad Prism software.

Results: 532 Whipples procedures were performed, (292 males, 240 females). The mean age of patients was 62.8 years, (range 5–132 years). Tumour site was as follows: 39% head of pancreas, 26% ampullary, 13% distal common bile duct and 7% duodenum. Post

operative histology was benign in 10%. Mean follow up was 6.75 years, (range 1–23 years). Postoperative mortality at 30 and 60 days was 2.6 and 3% respectively. Overall 1, 3 and 5-year survival was as follows 77%, 54% and 33%. Median survival was 531 days.

Conclusions: This large single institutional series illustrates excellent short and long-term survival data following pancreatic resection for presumed pancreatic malignancy. The data is consistent with that published by other specialist HPB units.

PO23-04

VARIATIONS IN MEDICAL ONCOLOGY UTILIZATION PRACTICES BY PANCREATIC CANCER PATIENTS IN A SINGLE PAYER HEALTH CARE SYSTEM

Scott Hurton, Geoff Porter, Mark Walsh and Michele Molinari
Dalhousie University, Canada

Introduction: Population based studies in the USA have shown that pancreatic cancer (PC) has one of the lowest rates of cancer directed therapy among solid organ malignancies. Socio-economic factors, referral patterns and unequal access to health-care might be responsible. There is a lack of data on PC patients living in regions where health care is uniformly available. The main aim of this study was to assess PC-directed therapy in a cohort of patients diagnosed with PC in Nova Scotia (Canada).

Method: A cohort of 1129 patients with PC was identified using the Provincial Cancer Registry over a 10-year period (2001–2010). Demographic, clinical and socio-economic data were extracted from the linkage of multiple administrative databases. Predictors of medical oncology healthcare utilization in PC patients were explored by multivariate regression analyses.

Results: Curative resection was performed in 163 patients (14.4%) and palliation in 996 (85.6%). Of all resected patients, 45% had a medical oncology visit for adjuvant therapy. In addition, only 34.4% of all resected patients visited medical oncology within 10 weeks. Among the unresected patients, 31% were referred for palliative chemotherapy. There was greater attrition between referral to medical oncology and actual visit to medical oncology in resected patients versus unresected patients (14.1% vs. 4.6%). Upon multivariate analysis, only advanced age ($p = 0.0092$) and presence of comorbidities ($p = 0.0029$) were the only significant factors predictors for failure of PC directed therapy. Socioeconomic status and rural residence were not significant predictors of medical oncology visit for chemotherapy consideration.

Conclusions: The majority of patients with PC did not receive cancer directed therapy, despite the universal availability of healthcare services. Socioeconomic characteristics and distance to medical centers did not have a significant effect in utilization of adjuvant or palliative oncological treatments.

PO23-05

DIFFERENT FACTORS INFLUENCE SURVIVAL IN DIVERSE AGE GROUPS FOLLOWING SURGERY FOR PANCREATIC CANCER

Antanas Gulbinas, Kestutis Urbonas,
Giedrius Barauskas and Juozas Pundzius
Lithuanian University of Health Sciences, Lithuania

Introduction: Current overviews show that pancreatoduodenectomy can be safely performed for patient's age 70 years and over in terms of postoperative complications and mortality though it is challenging and highly depends on multidisciplinary team approach. Despite increasing age of patients there is a lack of data on deeper analysis of factors influencing long term survival in elderly.

Method: The data of 251 patients who underwent major surgery for adenocarcinoma of the head of the pancreas was prospectively collected and analyzed. Values of results were presented as means \pm SD and as medians. Survival rates were summarized using the Kaplan-Meier method, and the log-rank test was used to compare differences in survival between different age groups. Cox proportional hazard model was applied to identify prognostic factors that were independently associated with survival.

Results: The median overall survival of 14.9 month was observed. Median survival of group <70 years was 16.2 month and 13.8 month for group 70 years and over. Multivariate analysis revealed that R1 resection (HR 1.76; CI 1.16–2.67), poor tumor differentiation grade (G3-G4) (HR 1.48; CI 0.96–2.28) were factors associated with worse survival for group <70 years. Lymphnode metastases (HR 4.89; CI 2.49–9.56) and perineural spread (HR 2.73; CI 1.48–5.06) were independent factors negatively influencing survival in age group >70 years.

Conclusions: Different factors influence survival in diverse age groups following surgery for pancreatic cancer: elderly patient's survival is mainly influenced by tumor outspread, whereas tumor characteristics are the main prognosticators in younger patients.

PO24-01

PANCREATIC ANASTOMOTIC LEAKAGE AFTER PANCREATODUODENECTOMY. RISK FACTORS, CLINICAL PREDICTORS AND PATIENTS OUTCOMES

Ehab El-Hanafi and Waleed Askar
Mansoura university, Egypt

Introduction: Postoperative pancreatic fistula (POPF) after pancreatoduodenectomy PD remains a challenge even at high volume centers. This study was designed to analyze perioperative risk factors for POPF after PD and evaluate the factors that predict the extent and severity of leak.

Method: We retrospectively studied all patients who underwent PD in our Center, from January 2001 to June 2012.

Demographic data, preoperative, intraoperative, postoperative variables were collected. The amylase of serum and drainage fluid was measured on postoperative day (POD) 1, 3, and 5. Blood picture and Liver functions were measured on POD 1, 5.

Results: A total of 471 consecutive patients underwent PD in our center. Fifty seven patients (12.1%) developed a POPF of any type. 21 patients (4.5%) had a fistula type A, 22 patients (4.7%) had a fistula type B and the remaining 14 patients (3%) had a POPF type C. Cirrhotic liver ($p = 0.05$), BMI >25 kg/m² ($p = 0.0001$), soft pancreas ($p = 0.04$), pancreatic duct diameter <3 mm ($p = 0.0001$), pancreatic duct located <3 mm to the posterior border ($p = 0.02$) significantly associated with POPF. with the multivariate analysis both BMI and pancreatic duct diameter were demonstrated to be independent factors. The hospital mortality in this series was 11 patients (2.3%), the development of POPF type C was associated with a significantly increased mortality (7/14 patients). POD 1, 5 a drain amylase level >4000 IU/L, WBC, pancreatic duct diameter, pancreatic texture were predictors for clinical evident POPF using (ROC) curve

Conclusions: Cirrhotic liver, BMI, soft pancreas, pancreatic duct diameter <3 mm, pancreatic duct near posterior border are risk factors for development of POPF. POD 1, 5 a drain amylase level, WBC, pancreatic duct diameter, pancreatic texture may be predictors for POPF B,C.

PO24-02

PROSPECTIVE CONSECUTIVE ANALYSIS ON THE AMOUNT OF DIETARY INTAKE AFTER PANCREATODUODENECTOMY; IS PPPD INFERIOR TO SSPPD IN POSTOPERATIVE ORAL INTAKE TOLERANCE?

Yasutoshi Kimura, Masafumi Imamura, Makoto Meguro, Tatsuya Itoh, Toshihiko Nishidate, Masayuki Ishii, Takayuki Nobuoka, Toru Mizuguchi and Koichi Hirata

Sapporo Medical University, Japan

Introduction: Fast-tracking surgery is demanded in patients underwent with pancreatoduodenectomy (PD). Several potential factors associating with the prolongation of postoperative hospital stay have been discussed, such as the type of PDs, reconstruction methods and other complications.

A prospective consecutive study was conducted to evaluate the postpancreatoduodenectomy (PD) oral intake tolerance. The occurrence of delayed gastric emptying (DGE) and the amount of dietary intake were analyzed. The relative merits for oral intake tolerance between PPPD and SSPPD were additionally determined.

Method: Between 2004 and 2012, 146 consecutive patients underwent PDs. Perioperative data were prospectively collected in all patients, and the patient's postoperative dietary intake was recorded for all meals until discharge. We introduced the total amount of die-

tary intake (TDI, Akizuki E, Kimura Y, et al., Ann Surg 2009) as an indicator of early postoperative oral intake tolerance (day 1 to 21). The postoperative outcomes were compared between PPPD and SSPPD. Multivariate analysis for factors associated with low TDI was performed.

Results: The occurrence of DGE as defined by ISGPS was 18.5% (27/146; A/B/C = 7/5/15) in all patients, and there was no difference between PPPD (15.9%) and SSPPD (22.4%). The daily dietary intake was gradually recovered in patients with both types of PDs; however, the value was significantly better in PPPD patients after POD 14 ($p < 0.05$). The median TDI value in patients with PPPD (6.4) was superior to that with SSPPD (4.5) ($p = 0.007$). Multiple regression analysis revealed that the type of PDs (PPPD vs. SSPPD, regression coefficient = 0.180, $p = 0.045$) and DGE (regression coefficient = -0.423 , $p < 0.001$) were associated with TDI values.

Conclusions: TDI values provided detailed information for analyzing postoperative oral intake tolerance, although the ISGPS definition of DGE seemed available for recent postoperative patient-care. The risk factors for low oral intake tolerance after PDs proved to be the type of operation (SSPPD) and DGE.

PO24-03

THE 2 LAYERS PANCREATICO-JEJUNOSTOMY DECREASE THE RISK AND GRAVITY OF PANCREATIC FISTULA AFTER PANCREATICODUODENECTOMY

Béatrice Aussilhou, Safi Dokmak, Fadhel Samir Ftériche, Olivier Farges, Jacques Belghiti and Alain Sauvanet

Beaujon Hospital, France

Introduction: The best type of pancreatic anastomosis after pancreaticoduodenectomy (PD) at lower risk and gravity of pancreatic fistula (PF) is not well defined. Our aim was to compare our experience with two types of pancreatiko-jejunosomies (PJ) performed in a tertiary centre by a single surgeon.

Method: From January 2009 to August 2012, 100 patients underwent PD by a single surgeon (BA) at two consecutive periods of time and data were studied retrospectively from a prospective maintained database and divided in two groups: Group A1 ($n = 50$) with a PJ in one layer and group A2 ($n = 50$) with a PJ in two layers. These two groups were compared in term of mortality, rate and gravity (B and C) of pancreatic fistula and hospital stay. PF rate and gravity were defined according to ISGPF. A1 was compared to A2.

Results: There was no significant difference between the two groups regarding age, sex, BMI, underlying pathology, texture of the pancreas and the size of the main pancreatic duct. The mortality was 0% and 2%, respectively (NS). The rate of PF (42% vs. 12%; $p < 0.01$), grade B (62% vs. 33%; $p < 0.01$) and grade C (5% vs. 2%; NS) was significantly more important in the group A1. the duration of hospital stay was significantly longer in the group A1 (23 vs. 15 days, $p < 0.0001$).

Conclusions: This study showed that the PJ in two layers is associated with decreased rate and gravity of pancreatic fistula and should be the anastomosis of choice after pancreaticoduodenectomy.

PO24-04

SMA-FIRST APPROACH THROUGH THE TREITZE LIGAMENT IN LAPAROSCOPIC PANCREATODUODENECTOMY

Yorihiko Muto, Akihiro Cho, Hiroshi Yamamoto, Osamu Kainuma, Nobuhiro Takiguchi, Yoshihiro Nabeya, Hiroo Yanagibashi, Takahito Masuda, Mamoru Sato and Matuo Nagata

Division of Gastroenterological Surgery, Chiba Cancer Center Hospital, Japan

Introduction: Although minimally invasive surgery has been widely spread, laparoscopic resection for invasive pancreatic ductal adenocarcinoma (PDAC) is still not universally accepted as an alternative approach for open surgery. On the other hand, the technical aspects of this complex operation continues to fascinate surgeons and this has been resulted in a number of modifications.

Method: 14 patients with PDAC underwent laparoscopic pancreaticoduodenectomy (LPD) using SMA-first approach through the Treitze ligament in our institution.

Surgical technique: With the transverse colon lifted upward, the Treitze ligament is opened, and the pancreatic head and the duodenum are freed from the anterior surface of the IVC. The origin of the SMA covered with loose connective tissue is identified and taped cephalad to the left renal vein. Dissection of the nerve plexus around the SMA proceeds from the origin to the branching point of the IPDA. The IPDA is originating from the first jejuna artery or directly from the SMA. A counterclockwise rotation of the SMA facilitates isolation and ligation of the IPDA arising from the posterior surface of the SMA.

Results: In all patients, SMA-first approach through the Treitze ligament and early ligation of the IPDA could be successfully performed, as planned.

Conclusions: The present procedure is safe, feasible, and useful in LPD for PDAC.

Conflict of Interest: We have no conflicts of interest or financial ties to disclose.

The present procedure is safe, feasible, and useful in LPD for PDAC.

PO24-05

DEFINING THE OPTIMAL EXTENT OF VASCULAR RESECTION AT PANCREATODUODENECTOMY (PD): SYSTEMATIC ASSESSMENT OF OUTCOME FROM RESECTION INCORPORATING THE SUPERIOR MESENTERIC ARTERY (SMA)

Mahmoud Abdel Dayem, Santhalingam Jegatheeswaran and Ajith Siriwardena
Manchester Royal Infirmary, United Kingdom

Introduction: PD is the treatment of choice for non-metastatic, localised cancers of the head of the pancreas in patients without major co-morbidity. Technically, resection can be prevented when tumour progression involves the portal/superior mesenteric vein or the SMA. Although venous resection is increasingly accepted, SMA resection remains unestablished. Given the rarity of SMA resection in any given series, this study undertakes an analysis of pooled data on arterial resection in order to assess outcome.

Method: Medline and embase were searched for the period 2000–2013 selecting only articles in English which provided complication profile, outcome and survival data allocatable to patients undergoing arterial resection at PD.

Results: During this period four manuscripts provided information on 25 patients undergoing PD with SMA resection. Reconstruction (available for 17) was by flap rotation of the splenic artery in nine (53%), graft in six (35%) and primary end-end anastomosis in 2 (12%). Median (range) operating time was 820 (441–1190) min., blood loss 6650 (2400–15,900) mL and 30-day mortality was three (12%). Median survival was 11 (0–29) months.

Conclusions: The addition of SMA resection to PD produces a lengthy operative procedure with high reported blood loss but acceptable 30-day mortality. As the median survival is similar to that for non-operated pancreatic cancer, SMA resection at PD should only be undertaken in the context of national clinical trials with mandatory reporting of quality of life measures.

PO25-01

LIGAMENT OF TREITZ APPROACH IN LAPAROSCOPIC MODIFIED RAMPS

Hiroki Sunagawa, Kanako Ogura, Tomoro BaBa, Toshio Harumatsu, Shogo Kinjo, Tomohumi Orokawa, Yasuaki Mayama, Susumu Inamine, Tetsuo Toyama and Naoto Oshiro
Nakagami Hospital, Japan

Introduction: Laparoscopic distal pancreatectomy (Lap-DP) is regarded as a safe and effective procedure for low malignant potential pancreatic tumors. Lap-DP for pancreatic cancer is being applied with increasing frequency in selected cases. However, the use of this procedure for pancreatic cancer is still controversial. The main goals of pancreatic cancer surgery are to obtain an R0 and sufficient regional lymph nodes. Radical antegrade modular pancreatectomy (RAMPS) was introduced to obtain a higher rate of R0 and a higher lymph node count. However, there is no standard laparoscopic technique for left-sided pancreatic cancer.

Method: We started the procedure by dissecting the ligament of Treitz. We entered and spread the anterior space of the aorta and IVC where the left renal vein was exposed. We also dissected the lymph nodes of the root of SMA, and following RAMPS was performed.

Results: The technique was used in three patients who had pancreatic cancer within the pancreas. The median length of the operation was 417 min, the median blood loss was 75 ml, the median number of retrieved lymph nodes was 31 and all three patients underwent an R0.

Two patients began to receive adjuvant chemotherapy by POD 14.

Conclusions: The ligament of Treitz approach in laparoscopic modified RAMPS offered R0 resection and the resection of sufficient regional lymph nodes. The procedure also allowed adjuvant chemotherapy to be started early in the postoperative course.

PO25-02

THE HAMMERSMITH LAPAROSCOPIC PANCREATICOGASTROSTOMY: A NOVEL LAPAROSCOPIC PANCREATIC ANASTOMOSIS DURING CENTRAL PANCREATECTOMY

Tamara Gall, Mikael Sodergren, Adam Frampton and Long Jiao
Hammersmith Hospital, United Kingdom

Introduction: Central pancreatectomy (CP) is preferred to distal pancreatectomy (DP) for the excision of benign tumours at the neck or body of the pancreas, in order to preserve pancreatic parenchyma and the spleen. However, the pancreaticoenterostomy is technically difficult to perform laparoscopically and the post-operative pancreatic fistula (POPF) rate is high. Thus there are few reported series of laparoscopic CP. We present the Hammersmith Laparoscopic Pancreaticogastrostomy (HLPG) technique, a novel method for reconstruction of the pancreatic stump during CP. This method is technically easier to perform than standard techniques.

Method: From March 2012 to July 2013, four patients underwent HLPG during a laparoscopic CP. This involves creating a sleeve gastric tube for an end-to-end anastomosis between the distal pancreatic stump and the stomach. Operative outcomes were reviewed prospectively.

Results: Two males and two females with a median age of 49 years had a CP with HLPG. The total operative time was 437.4 ± 12 mins (mean \pm sd) and the time taken for reconstruction of HLPG anastomosis was 37.6 ± 7.6 min. (mean \pm sd). After a median follow-up of 27.5 months there was no mortality. One patient had a grade A postoperative pancreatic fistula (POPF) requiring no medical or surgical treatment.

Conclusions: The HLPG is technically easy to construct laparoscopically. It is a feasible operation which may reduce operative time and POPF rate. A larger series in the future will fully evaluate the operative outcomes.

PO25-03

THE PANCREATICO-JEJUNOSTOMY (PJ) IN TWO LAYERS SEEMS TO DECREASE THE RISK OF PANCREATIC FISTULA AND THE GRAVITY OF PANCREATIC FISTULA

Beatrice Aussilhou, Safi Dokmak, Alain Sauvanet, Olivier Farges and Jacques Belghiti
Beaujon Hospital, France

Introduction: The type of pancreatic anastomosis after Whipple procedure is not well defined to decrease the

rate of pancreatic fistula and their gravity. Our aim was to compare two types of pancreatico-jejunostomies performed in the same center.

Method: From January 2009 to August 2012, 100 patients underwent a Whipple procedure, including two groups: A1 (n = 50) with a pancreatico-jejunostomy in one layer and A2 (n = 50) with a PJ in two layers. The two groups were similar in terms of age, sex, BMI, diagnosis including adenocarcinoma (n = 24 in group A1 and n = 22 in group A2), neuroendocrine tumor (n = 5 in group A1 and n = 3 in group A2), ampulloma (n = 6 in group A1 and n = 5 in group A2), cholangiocarcinoma (n = 0 in group A1 and n = 7 in group A2) and IPMN (n = 8 in group A1 and n = 0 in group A2), texture of the pancreas and height of the pancreatic duct. These two groups were compared in term of rate of pancreatic fistula and its gravity, duration of hospital stay and mortality.

Results: The mortality was nil in the group A1 and 2% (one patient) in the group A2. The rate of pancreatic fistula was significantly more important in the group A1 (42% vs. 12%, $p < 0.01$) with 62% versus 33% of grades B and 5% versus 2% of grades C. the duration of hospital stay was significantly longer in the group A1 (23 versus 15 days, $p < 0.0001$).

Conclusions: This study showed that the PJ in two layers is associated to a decreased rate of pancreatic fistula and a shorter duration of hospital stay.

PO25-04

A NOVEL U-SUTURE TECHNIQUE FOR END-TO-END INVAGINATED PANCREATICOJEJUNOSTOMY FOLLOWING PANCREATOCODUODENECTOMY

Xiao-ping Chen, Zhi-yong Huang, Josef WY Lau, Bi-xiang Zhang, Zhi-wei Zhang, Yi-fa Chen, Wan-guang Zhang and Peng Zhu
Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, China

Introduction: Internationally, POPF remains a leading cause of morbidity and mortality after pancreaticoduodenectomy (PD). In order to reduce the POPF incidence, a number of technical modifications for pancreato-enteric anastomosis after PD have been proposed. In 1995, we established a new technique with transpancreatic transverse U-sutures for end-to-end invaginated pancreaticojejunostomy after a PD (Chen's U-Stitch technique), and the preliminary results were quite encouraging. This study aims to review a new surgical approach, the Chen's U-Stitch technique, for end-to-end invaginated pancreaticojejunostomy (PJ), and to evaluate the effectiveness of this approach with reducing the incidence of postoperative pancreatic fistula (POPF) formation.

Method: To evaluate this new approach, during 2002 to 2012, 264 patients who received the new Chen's U-Stitch technique after a PD were included in this study. The postoperative morbidity and mortality including the POPE incidence were analyzed.

Results: The postoperative morbidity was 22.3% (22/264) and mortality was 0% (0/264). The POPF rate

was 3.4% (9/264) for Grade A, 0.8% (2/264) for Grade B, and 0% (0/264) for Grade C.

Conclusions: This new surgical technique (Chen's U-Stitch) which involves an end-to-end invaginated pancreaticojejunostomy with 2-4 transpancreatic transverse U-sutures provides excellent outcomes at reducing the POPF incidence after PD. This technique is a simple approach that is time-saving and can also be safely applied in patients with soft pancreas and/or small pancreatic ducts.

PO25-05

PANCREATOCODUODENECTOMY IN PATIENTS WITH CHRONIC LIVER DISEASE

Ippei Matsumoto, Sachiyo Shirakawa, Makoto Shinzeki, Sadaki Asari, Tadahiro Goto, Taro Okazaki, Masahiro Kido, Tetsuo Ajiki, Takumi Fukumoto and Yonson Ku

Kobe University Graduate School of Medicine, Japan

Introduction: Surgery in patients with chronic liver disease (CLD) is at high risk of postoperative morbidity and mortality. We retrospectively investigated short- and long-term outcomes after pancreaticoduodenectomy (PD) in CLD patients.

Method: We reviewed consecutive 260 patients who had undergone PD in our institution from 2003 until 2011 and identified 21 patients (8%) with CLD, included 16 in Child-Turcotte-Pugh (CTP) class A, four in B, and one in C. Outcomes were compared to 21 matched control patients in age-, sex-, disease- and UICC-stage.

Results: Preoperatively, significantly higher serum creatinine and international normalized ratio, and lower serum albumin were noted in CLD group. There was no significant difference between the two groups in operative time, blood loss, and the rate of blood transfusion, although higher use of fresh frozen plasma (FFP) was found in CLD group. Postoperative morbidities were significantly higher in CLD group than those in non-CLD group (100% vs. 38%, $p < 0.001$), whereas no in-hospital mortality occurred in both groups. Some CLD patients experienced severe complications (refractory ascites and sepsis) and required intensive management: prolonged course of antibiotics; use of diuretics and FFP; and enteral nutrition including BCAAs. The 2-year disease free survivals for CLD and non-CLD group were 70% and 75% ($p = 0.95$), and overall survivals were 57% and 84% ($p = 0.09$), respectively. Three of CLD patients died from causes other than cancer. Nine patients with CLD were administered additional drugs for liver disease postoperatively as daily medication. Postoperative adjuvant chemotherapy (AC) was indicated for 11 CLD and 14 non-CLD patients. However, only 6 (55%) CLD patients received AC, whereas 13 (93%) non-CLD patients received AC ($p = 0.04$).

Conclusions: In CLD patients, high rate of complications associated with hepatic decompensation were identified in early postoperative course. And late worsening liver dysfunction after PD may increase liver related death.

PO26-01

STEREOTACTIC RADIOTHERAPY PLUS SURGICAL RESECTION FOR LARGE HEPATOCELLULAR CARCINOMA: A CASE SERIES AND PATIENTS OUTCOME

Chin-cheung Cheung and Kong-ling Ting
Tuen Mun hospital, Hong Kong, China

Introduction: Currently there is no consensus on the management of large inoperable hepatocellular carcinoma (HCC) (more than 10 cm). Therefore, we evaluated the clinical outcomes of patients received surgical resection after stereotactic radiotherapy (SRT) for large HCC in a regional hospital in Hong Kong.

Method: A registry database of 160 patients treated with stereotactic radiotherapy for inoperable HCC between 2009 and 2012 were analysed retrospectively. Six patients were found to have large HCC with an average size of 14.6 cm (10.4–23.5 cm) and suboptimal remnant liver volume (RLV) with child-Pugh class A cirrhosis. They were treated with TACE once and followed by SRT. The effect of SRT was reviewed by computer tomographic scan 2 months after receiving SRT. Liver resection was done for patients with optimal RLV while extrahepatic metastases were excluded.

Results: All six patients received pre-operative SRT with significant tumour shrinkage and compensatory hypertrophy of the normal liver tissue which markedly improved RLV. Open right hemi-hepatectomy were performed afterwards. Intra-operative radiation related adhesions over diaphragm, retroperitoneum and inferior vena cava nearby regions were encountered and tackled. All patients had no surgical related complications; prolonged operative time or increased blood loss was reported. Post-operatively, there was no radiation induced liver disease or liver failure noticed. One of them showed complete necrosis and resolved of main portal vein tumour thrombosis after the SRT and he remained disease free for four years after operation.

Conclusions: Pre-operative SRT combined with liver resection, may be effective in treating large HCC with acceptable radiation toxicity. Further assessment of down-staging efficacy of SRT, optimal time interval between SRT and resection, and survival benefit will be evaluated by further randomised controlled study.

PO26-02

EFFICACY OF SORAFENIB AS ADJUVANT THERAPY TO HEPATOCELLULAR CARCINOMA PATIENTS AFTER HEPATECTOMY

Zhao Gang, Hao Xi-shan and Song Tian-qiang
Tianjin Medical University Cancer Institute and Hospital, China

Introduction: High recurrence rate is a major negative factor for the prognosis of hepatocellular carcinoma patients, and many factors, especially vascular invasion (including macroscopic and microscopic) have been proven to be related with postoperative high recurrence rate. Sorafenib is the only one drug that can

improve the prognosis to the advanced patients. But until now, there are few researches about the effect about Sorafenib in adjuvant treatment. So the aim of our study is to evaluate whether HCC patients can get benefit after hepatectomy through Sorafenib.

Method: There were 55 HCC patients who underwent operation. For the patients with high risk recurrence factors, we recommend Sorafenib 400 mg po bid as adjuvant therapy. All the patients were followed up each 3 months. Clinical data were collected and analyzed.

Results: In those 55 patients, there were 34 patients with macroscopic vascular invasion (MaVI) and 21 patients with microscopic vascular invasion (MiVI) and satellite lesion. And there were 24 patients (14 with MaVI and 10 with MiVI) as adopted Sorafenib and 31 patients (20 with MaVI and 11 with MiVI) as control group. The median follow-up time was 20.33 months (range, 2.73–38.57). The recurrence free survival time (month, mean \pm standard deviation) of the Sorafenib Group and Control Group in the whole patients, patients with MaVI and patients only with MiVI & satellite were: 16.76 ± 2.42 versus 6.83 ± 1.31 ($p = 0.000$), 12.56 ± 2.64 versus 6.31 ± 1.90 ($p = 0.037$) and 20.88 ± 3.39 versus 7.78 ± 1.40 ($p = 0.002$) respectively. The overall survival time (month, mean \pm standard deviation) of the Sorafenib Group and Control Group in the whole patients, patients with MaVI and patients only with MiVI & satellite lesion were: 28.04 ± 1.88 versus 19.97 ± 2.78 ($p = 0.002$), 26.02 ± 2.85 versus 15.20 ± 2.56 ($p = 0.028$) and 29.52 ± 1.60 versus 23.52 ± 4.35 ($p = 0.037$) respectively.

Conclusions: This study showed that using Sorafenib as adjuvant therapy could prevent recurrence and improve prognosis. This maybe a potential evidence to use Sorafenib after operation. But we should need a multicenter large number randomized controlled trial to prove.

PO26-03

SEQUENTIAL TRANSCATHETER ARTERIAL CHEMOEMBOLIZATION AND PORTAL VEIN EMBOLIZATION FOR HCC RESECTION IN CIRRHOTIC PATIENTS IMPROVES OUTCOME AND INCREASES TUMOR NECROSIS: A CASE MATCHED CONTROL STUDY

Daniele Sommacale¹, Tullio Piardi¹, Yohann Renard¹, Alexandra Heurgue¹, Thomas F Baumert², Jacques Marescaux², Reza Kianmanesh¹ and Patrick Pessaux²
¹DUNE POLE, France; ²Pole Hepato-digestive-Hopitaux Universitaires of Strasbourg-University of Strasbourg, France

Introduction: Portal vein embolization (PVE) alone or sequential transcatheter arterial chemoembolization (TACE) and PVE were proposed before hepatocellular carcinoma (HCC) resection. The aim of this study was to compare the early post-operative course of these two therapeutic strategies.

Method: Between January 2012 to June 2013, 12 patients underwent a sequential TACE + PVE (group 1). This group of patients was matched to 12 control

patients who underwent HCC resection after PVE alone (group 2) from historical database. The two groups were matched for: age, sex, number and size of HCC, volume of FLR, Child score.

Results: Baseline patient and tumor characteristics were similar in the two groups. In all patients the radiological treatment was well tolerated. The mean increase of FLR volume was 10% in group 1 and 7% in group 2 ($P = n.s.$). All patients underwent a subsequent hepatic resection: in group 1, 10 major hepatic resections were performed versus 12 in group 2 ($P = n.s.$). The post-operative incidence of hepatic failure (HF) was higher in the group 2 (41.6%, 5/12) than in the group 1 (8.3%, 1/12). Among five patients (group 2), only one died for HF at postoperative day-9. Major complications (Dindo \geq III) was 25% ($n = 3$) in group 1 and 33.3% ($n = 4$) in group 2 ($P = n.s.$). Post-operative day-60 mortality rate was 8.3% ($n = 1$) in group 1 and 25% ($n = 3$) group 2 ($P = n.s.$). The mean hospitalisation stay in ICU was statistically higher in group 1 (3.25 days; range: 1–16 days) than in group 2 (18.5 days; range: 3–67) ($P = 0.03$). The incidence of tumour necrosis was significantly higher in the group 1 (11/12 vs. 3/12, $p = 0.002$).

Conclusions: Sequential TACE and PVE before HCC resection increases the rate of FLR with a better post-operative course and increases the rate of tumor necrosis.

PO26-04

EFFECTS OF TACE/PVE COMBINATION BEFORE MAJOR LIVER RESECTION FOR HCC IN CIRRHOTIC PATIENTS – THE SAINT-ANTOINE EXPERIENCE

Lilian Schwarz, Olivier Scatton, Julien Cazejust, Dominique Wendum, François Cauchy, Fabiano Perdigao, Ailton Sepulveda, Denis Bernard and Olivier Soubrane

Hopital St Antoine, France

Introduction: Preoperative transarterial chemoembolization/portal vein embolization combination (TACE/PVE-c) has been proposed before major hepatectomy for large HCC in cirrhotic patients. The aim of this study was to assess its impact both on tumor and FLR. **Method:** From November 2009 to April 2013, 27 patients with HCC and insufficient FLR underwent TACE/PVE combination. The median time interval between TACE and PVE was 28 [15–68] days. Computed tomography assessed liver volume 3 weeks after PVE. Data on clinical and pathological features, and survival outcomes were retrospectively analyzed.

Results: Median age was 60 [46–79] years and 25 (93%) patients were male. The median tumor size was 60 mm [18–180], and 15(55%) patients had a single tumor. According to the BCLC classification, 5 patients (18%) were BCLC 0-A, 16 (60%) BCLC B, and 6 (22%) BCLC C. Twenty-two (81%) patients had cirrhosis. TACE and PVE morbidity rate were both 18%, and contraindicated surgery in 1 (3.7%) patient. Three other patients were not candidates for resection because of tumoral progression ($n = 1$), and portal hypertension

($n = 2$). The median pre-, post-TACE/PVE FLR, and liver hypertrophy were 28% [13–57], 39% [14–66], and 11% [6–33], respectively. Resection was performed in 23 cases including 17 (74%) right hepatectomies, 3 (13%) right hepatectomies extended to middle hepatic vein and 3 (13%) right trisectionectomies. Associated contralateral liver tumorectomy/ablation was performed in 5(22%) cases. Pure laparoscopic approach was used in 6 (26%) cases. Postoperative liver failure occurred in 5 (22%) cases. Mortality rate was 4%. On pathological analysis, tumor necrosis ranged from 50 to 90% in 9 (39%) cases and exceeded 90% in 10 (43%) cases. After a median follow-up of 17 months, 20 patients were alive (7 without recurrence). Fifteen patients experienced recurrence after a median interval of 15[4–40] months.

Conclusions: In this series, TACE/PVE allowed for both hypertrophy of FLR and pathological response of HCC. Further investigations are required to confirm its potential neoadjuvant role before surgical resection of HCC.

PO26-05

NEOADJUVANT TRANSCATHETER ARTERIAL EMBOLIZATION AND PORTAL VEIN EMBOLIZATION BEFORE MAJOR HEPATECTOMY FOR SINGLE HEPATOCELLULAR CARCINOMA NO LARGER THAN 10 CM LOCATED IN RIGHT LIVER

DongHwan Jung, SungGyu Lee, Shin Hwang, KiHun Kim, ChulSoo Ahn, TaeYong Ha, GiWon Song, GilChun Park, YoungIn Youn and WanJoon Kim

Asan Medical Center, Ulsan University, Korea

Introduction: There are several kinds of liver resections for single hepatocellular carcinoma (HCC) located in right liver. The aim of this study was to evaluate the survival impact of sequential neoadjuvant transcatheter embolization (TACE) and portal vein embolization (PVE) for single HCC no larger than 10 cm located in right liver.

Method: Between January 1997 and December 2010, 70 patients with single HCC underwent right hepatectomy after sequential neoadjuvant TACE and PVE (Neoadjuvant group). 230 patients with single HCC underwent right hepatectomy without TACE and PVE (Classic group).

Results: There were no differences in sex, age, tumor differentiation, vascular invasion, satellite lesion, and preoperative AFP level between two groups. Tumor size was significantly larger in the Classic group ($p = 0.005$, 5.70 cm vs. 4.75 cm). Resection margin was significantly wider in the Neoadjuvant group ($p = 0.005$, 2.89 cm vs. 2.03 cm). The 5-year overall survival and disease-free survival rates in the Neoadjuvant group were 85.0% and 61.2%, respectively, both of which were significantly better than the 66.3% and 42.7% seen in the Classic group ($p = 0.008$ and $p = 0.013$, respectively). Better effects of the Neoadjuvant group on both overall and disease-free survival

were seen in patients having HCC 5 cm or less in diameter. However, no significant difference in either overall or disease-free survival was seen in patients having HCC larger than 5 cm in diameter.

Conclusions: Neoadjuvant TACE and PVE before right hepatectomy for single HCC no larger than 5 cm leads to longer overall and disease-free survival than right hepatectomy without TACE and PVE.

PO27-01

ELEVATION OF PORTAL VEIN PRESSURE PREDICTS POSTHEPATECTOMY LIVER FAILURE FOLLOWING RIGHT LOBECTOMY

Hiroya Iida, Tsukasa Aihara, Shinichi Ikuta and Naoki Yamanaka

Meiwa hospital, Japan

Introduction: We usually decide an extent of hepatic resection according to a level of ICGR 15 in Japan. However, AP-shunt and constitutional ICG excretory defect modified value of ICGR 15. Therefore we use intraoperative portal pressure for an additional tool of evaluation of hepatic function reserve. The aim of this study is to evaluate the usefulness of measuring intraoperative portal pressure as predicting posthepatectomy liver failure (PHLF).

Method: We retrospectively analyzed outcomes of 35 patients who underwent measurement of intraoperative portal pressure prior and posterior to right lobectomy between April 2004 and August 2012. We divide the patients according to post operative course uncomplicated group (n = 22) and PHLF group (n = 13). Grade B or C according to International study group of liver surgery (ISGLS) criteria was applied to PHLF in the present study. Patient background, intraoperative bleeding, operation time and elevation of portal pressure were compared between the two groups.

Results: There was significant difference in preoperative white blood count, intraoperative bleeding and elevation of portal pressure in univariate analysis ($p < 0.05$). Elevation of portal pressure was independent risk factor in multivariate analysis. In addition, elevation of portal pressure more than 3cmH₂O was associated with PHLF with 69.2% sensitivity and 90.9% specificity.

Conclusions: Elevation of portal pressure more than 3 cm H₂O after right lobectomy is a risk of PHLF. If the elevation of portal pressure more than 3 cm H₂O is observed following clamp of the right branch of portal vein, we should consider reducing the extent of resection.

PO27-02

COMPARISON OF REMNANT-TO-TOTAL VERSUS REMNANT-TO-STANDARD LIVER VOLUME RATIO AS PREDICTOR OF POSTOPERATIVE HEPATIC DYSFUNCTION AFTER LIVER RESECTION

Hee Joon Kim, Choong Young Kim, Young Hoe Hur, Yang Seok Koh, Jung Chul Kim, Chol Kyoon Cho and Hyun Jong Kim

Chonnam National University Medical School, Korea

Introduction: The future liver remnant (FLR) is usually calculated as a ratio of remnant liver volume (RLV) to total functional liver volume (RLV/TFLV). In liver transplantation, It is generally accepted that a ratio of graft volume to standard liver volume (SLV) need to be at least 30% to 40% to fit the hepatic metabolic demand of the recipient. Aim of this study was to compare RLV/TFLV versus RLV/SLV as a predictor of postoperative liver function and liver failure.

Method: CT volumetric measurements of RLV were obtained retrospectively in 74 patients who underwent right hemihepatectomy for malignant tumor from January 2010 to May 2013 at Chonnam National University Hwasun Hospital. RLV and TFLV were obtained using CT volumetry, and SLV was calculated using Yu's formula: $SLV (ml) = 21.585 \times \text{body weight (kg)}^{0.732} \times \text{Height (cm)}^{0.225}$. RLV/SLV ratio was compared with RLV/TFLV as a predictor of postoperative hepatic function.

Results: Posthepatectomy liver failure (PHLF), morbidity, serum total bilirubin level at postoperative day 5 (POD 5) were increased significantly in group RLV/SLV $\leq 30\%$ compared with group RLV/SLV $> 30\%$ ($p = 0.002$, $p = 0.004$, and $p < 0.001$, respectively). But RLV/TFLV was not correlated with PHLF and morbidity ($p = 1.000$ and 0.798 , respectively). RLV/SLV showed more strong correlation with serum total bilirubin level than RLV/TFLV (RLV/SLV vs. RLV/TFLV, $R = 0.706$ vs. 0.499 , $R^2 = 0.499$ vs. 0.239).

Conclusions: RLV/SLV was more specific than RLV/TFLV in predicting postoperative course after right hemihepatectomy. To determine safe limit of hepatic resection, more large scaled, prospective study is needed.

PO27-03

IMPACT OF ESSENTIAL STRATEGY FOR EARLY NORMALIZATION AFTER SURGERY WITH PATIENT'S EXCELLENT SATISFACTION AFTER HEPATECTOMY FOR LIVER TUMORS

Morihiko Ishizaki, Masaki Kaibori, Kosuke Matsui, Hideyuki Matsushima, Tatsuma Sakaguchi, Richi Nakatake, Kentaro Inoue and A-Hon Kwon

Kansai Medical University, Japan

Introduction: We have revised Enhanced Recovery After Surgery (ERAS) program of the Europe dispatch into Japanese perioperative program (ESsential Strategy for Early Normalization after Surgery with

patient's Excellent satisfaction; ESSENSE). We have introduced the ESSENSE program in liver surgery.

Method: We compared the seven items between ESSENSE program (ESSENSE group; $n = 80$) and usually perioperative management (control group; $n = 78$). The examined seven items was as follows: (1). Abolition of preoperative colon preparation using purgative, (2). Abolition of preoperative long-term stopping of drinking and meal, (3). Exclusion of postoperative detention of gastric tube, (4). Exclusion of postoperative detention of abdominal drain, (5). Resumption of meal postoperative day 1, (6). Change of intraoperative interval of antibiotics from 3 hours to 4 or 7 hours, and postoperative days prescribed of antibiotics for four days to two days, (7). Introduction of prehabilitation. A hepatocellular carcinoma (HCC) patients with liver cirrhosis was treated with BCAA granules preoperative for 1 month and drunken with rehydration solution (total dose: 1000–1500 ml) until 3 hours before surgery. We started these changes as ESSENSE program from November, 2011 through a transition period.

Results: There were no differences between the two groups with respect to diagnosis and surgical procedure. The postoperative improvement of insulin resistance was recognized in the HCC patients of ESSENSE group. Introduction of perioperative exercise therapy was resulted in extension of walk distance immediately after operation. There were no differences between ESSENSE and control groups on postoperative complications outcomes (9/78 vs. 6/80; $p = 0.39$). Postoperative hospital stays were an average of 15 days and 19 days ($p = 0.04$) in the ESSENSE and control groups, respectively.

Conclusions: The ESSENSE program on liver surgery was effective for management of hepatic resection for liver tumors.

PO27-04

HEPATIC MICROCIRCULATION DURING LIVER RESECTION

Jan Nilsson, Sam Eriksson, Per-Jonas Blind, Roland Andersson and Christian Stureson
Clinical Sciences, Lund University, Sweden

Introduction: The aim of this study was to assess hepatic microcirculation before and immediately after resection of liver tumors using sidestream dark-field (SDF) imaging and to correlate changes with size of resection and early postoperative liver function.

Method: Hepatic microcirculation was measured intraoperatively on 40 patients undergoing liver resection for tumors. SDF imaging allowed assessment of functional sinusoidal density (FSD), sinusoidal diameter (SD) and sinusoidal red blood cell velocity (RBCV).

Results: Baseline microcirculatory parameters before resection was (mean \pm SEM) $FSD = 21.6 \pm 0.4$ mm/mm², $SD = 12.4 \pm 0.2$ mm and $RBCV = 188 \pm 16$ mm/s. Minor resections (<3 Couinaud's segments) caused no change in microcirculation parameters. Major resections (≥ 3 Couinaud's segments) resulted in an increase in RBCV by 74% ($p < 0.001$), whereas both FSD and SD remained constant. In (extended) right-sided hemihepatectomies, there was a

negative linear correlation between increase in RBCV and serum bilirubin levels on postoperative day 3 (Pearson's $r = -0.79$, $p = 0.002$).

Conclusions: For the first time in human subjects it was shown that increased liver blood perfusion after major liver resections, on the level of microcirculation, are due to an increase in RBCV. Intraoperative sinusoidal hyperperfusion after major liver resections is a marker of early postoperative liver function.

PO27-05

PERI-OPERATIVE N-ACETYLCYSTEINE DOES NOT MODIFY BIOCHEMICAL OR CLINICAL PARAMETERS OF OUTCOME AFTER LIVER SURGERY

Saurabh Jamdar, Santhalingam Jegatheeswaran, Paul Shuttleworth, Aali Sheen and Ajith Siriwardena
Manchester Royal Infirmary, United Kingdom

Introduction: Liver ischaemia-reperfusion (IR) injury associated with hepatectomy is an important cause of morbidity. N-acetylcysteine (NAC) protects against oxidative injury in experimental models of liver IR but there are no clinical trials evaluating NAC in hepatectomy. This study evaluates the effect of peri-operative infusion of NAC in patients undergoing liver resection.

Method: 117 liver resections (in 113 patients) during the period January 2009 to December 2010 constitute the study population. 87 (74%) underwent major resection (defined as 2 or more sections using Brisbane 2000 nomenclature). During this period, we employed a selective policy for use of NAC with continuous infusion (dose of 10 g/24 hour) commenced within 24 hour of hepatectomy until normalisation of liver function. NAC was given in 64 (55%) resections [no-NAC in 53 (45%)].

Results: The NAC group had a median (range) age of 62 (24–86) years compared to No-NAC group 66 (31–79) years ($p = 0.68$). In the NAC group there were 49 major/15 minor resections compared to 39 major/14 minor in the no-NAC group (Yates corrected chi square $p = 0.87$). Day 1 post-op ALT in NAC group was 276 (11–2213) U/l compared to 178 (10–2341) in non-NAC $p = 0.006$ (reference range 5–40). Day 3 ALT in NAC was 184 (13–1104) compared to 149 (11–2368) in non-NAC $p = 0.56$. There was no difference in length of stay ($p = 0.23$). There was 1 (0.8%) postoperative death.

Conclusions: This is the largest reported experience of the use of NAC to modify liver IR after hepatectomy. The distribution of major and minor resections was similar groups. NAC does not appear to modulate post-operative enzymatic liver function or benefit outcome.

PO28-02

METHODS TO DECREASE BLOOD LOSS DURING LIVER RESECTION

Constantinos Simillis¹, Tianjing Li², Jessica Vaughan¹, Lorne Becker³, Brian Davidson¹ and Kurinchi Gurusamy¹

¹University College London, United Kingdom; ²Johns Hopkins Bloomberg School of Public Health, USA;

³SUNY Upstate Medical University, USA

Introduction: The optimal treatment strategy for liver resection is not known.

Method: We searched the Cochrane Library, MEDLINE, EMBASE, and Science Citation Index Expanded until July 2012 to identify the randomised clinical trials (irrespective of language, blinding, or publication status) where the method of vascular occlusion, parenchymal transection, and management of the cut surface were clearly reported, and where patients were randomly assigned to different treatment strategies. Two review authors identified trials and collected data independently. We conducted a Bayesian network meta-analysis in WinBUGS. We calculated the odds ratios (OR) with 95% confidence intervals (CI) for the binary outcomes and mean differences (MD) with 95% CI for the continuous outcomes using fixed-effect model or random-effects model according to model-fit.

Results: We included a total of 496 participants randomised to seven different treatment strategies from seven trials in a network meta-analysis. All the trials were of high risk of bias. There was no significant difference in mortality, proportion of people transfused or hospital stay between the different strategies. Any reductions in blood loss and transfusion requirements were modest. There was significant increase in the proportion of people with serious adverse events (SAE) when surgery was performed using radiofrequency dissecting sealer (RFDS) compared to the standard clamp-crush method (OR 7.13; 95% CI 1.77–28.65). Quality of life and return to work were not reported in any of the trials.

Conclusions: There is currently no evidence to recommend any specific technique of liver parenchymal resection. Liver resection using RFDS appears to increase the serious adverse events and should be evaluated in further randomised clinical trials before routine use. Methods of liver resection using no special equipment seem to be as safe and effective as more complex methods requiring special equipment.

PO28-03

RISK FACTORS FOR ORGAN/SPACE SURGICAL SITE INFECTION AFTER HEPATECTOMY FOR HEPATOCELLULAR CARCINOMA

Seikan Hai, Yuji Iimuro, Shogo Tanaka, Nobukazu Kuroda, Tadamichi Hirano, Toshihiro Okada, Yasukane Asano, Kazuhiro Suzumura, Yuichi Kondo and Jiro Fujimoto

Hyogo College of Medicine, Japan

Introduction: Recently, advances in surgical techniques and perioperative management have allowed hepatectomy to be performed more frequently and safely,

which has reduced the mortality rate to 1.4–2.6%. However, the postoperative morbidity rate is still high, and surgical site infection (SSI), particularly organ/space SSI, is a common cause of major morbidity after hepatectomy for hepatocellular carcinoma (HCC).

Method: The clinical data from 448 patients who underwent hepatectomy for HCC in our department between January 2001 and December 2011 were retrospectively reviewed, and risk factors for organ/space SSI were analyzed.

Results: Organ/space SSI occurred in 48 patients (10.7%). The most common pathogens for infection were Staphylococcal bacteria. Patients with organ/space SSI needed significantly longer postoperative hospital care than the patients without organ/space SSI (median: 49 versus 23 days). The postoperative mortality rate was significantly higher in the patients with organ/space SSI (6 of 48 patients, 12.5%) than in those without organ/space SSI (9 of 400 patients, 2.25%). Multivariate analysis revealed repeat hepatectomy, blood transfusion and hypoalbuminemia (≤ 3.7 g/dl) to be independent risk factors for occurrence of organ/space SSI.

Conclusions: Organ/space SSI is closely related to prolonged postoperative hospital care and hospital death. Preoperative nutritional care and prevention of exceeding intraoperative blood loss are important to reduce the occurrence of organ/space SSI after hepatectomy for HCC.

PO28-04

WHETHER STEM CELLS ENHANCE OR INHIBIT THE GROWTH OF HEPATOMA CELLS?

Kuo-Shyang Jeng, Hsin-I Hsiau, Fang-Yu Chang and Ming-Che Yu

Far Eastern Memorial Hospital, Taiwan

Introduction: Stem cells have an ability to perpetuate themselves through self-renewal and to generate mature cells through differentiation. Some reported that stem cells enhance growth and metastasis of colon cancer cells and also pancreatic cancer cells. Whereas, Wang Y found stem cells inhibit the tumorigenicity of esophageal carcinoma cells. Whether stem cells enhance or inhibit growth and invasion of hepatoma cells remains unknown. We conduct this study to elucidate whether stem cells play as weapons or dangers for liver cancer treatment.

Method: RLE cells were derived from 10-d-old suckling Fisher (F344) rats. Separate coculture of rat hepatoma cells (H4-II-E-C3) with the isolated fresh RLE without any cell-to-cell contact using a cell culture insert. Comparisons of effects of growth, apoptosis and migration of H4-II-E-C3 cells among the ratio of RLE cells: H4 cells 1:5, 1:1 and 5:1 respectively. Total RNA isolation, RT, RNA isolation and real-time PCR to compare SHH pathway factors, Bcl-2, Bax, p53, IL-12, VEGF and SCF.

Results: RLE cells had an ability of promoting apoptosis of H4-II-E-C3. With the increment of RLE cells, the migration of H4-II-E-C3 cell decreased and the ratio of H4:RLE 1:5 was statistically significant ($p = 0.029$). The significant change of the main factors of SHH

pathway include SHH ($p = 0.029$) and GLI-1 ($p = 0.002$). The other factors are Bax ($p = 0.000$) p53 ($p = 0.005$) and stem cell factor ($p = 0.061$, borderline). **Conclusions:** From this study, the progenitor cells significantly increase the apoptosis and inhibit the growth and migration of rat hepatoma cells (H4-II-E-C3). The affecting factors include SHH, GLI-1, p53 and Bax. It may be helpful in further strategy for hepatoma treatment.

PO28-05

BLOCKING CD47 PROMOTES PHAGOCYTOSIS OF HUMAN HEPATOCELLULAR CARCINOMA CELLS

William Chapman¹, Z. Xiao¹, K. Ott¹, C. Chen¹, Y. Lin¹, L. Lin¹, W. Frazier¹, M. Kumar¹ and P. Manning²

¹Washington University in St Louis, USA; ²Vasculox, Inc, USA

Introduction: CD47 is a novel therapeutic target in solid cancers, however, no data support the role of CD47 in HCC. CD47 allows cancer cells to disguise themselves from the host immune system by blocking SIRPα on macrophages. We postulated that CD47 antibodies could promote phagocytic clearance. The aim of this study was to determine expression of CD47 on HCC tumors and to evaluate the ability of blocking CD47 monoclonal antibodies (CD47mAbs) in promoting phagocytosis.

Method: CD47 expression was determined in 10 HCC tumor samples and 6 normal livers by immunohistochemistry and in human primary hepatocytes and HepG2 cell line by flow cytometry. Toxicity of CD47mAbs for HepG2 cells was determined by MTT assay. Peritoneal macrophages were isolated from NOD/SCID/ (NDG) mice and co-cultured with HepG2 cells to assess phagocytosis under the following conditions: (1) untreated, (2) IgG control, (3) non-blocking CD47mAb control 2D3, (4) blocking CD47mAb 400.

Results: Immunofluorescence staining high expression of CD47 on HCC tissues, but not in normal liver. HCC demonstrated CD47 immunofluorescence intensity of 88.8 ± 2.50 , while normal liver had an intensity of 18.0 ± 0.50 . CD47 expression was also high in the HepG2 HCC cell lines, but low or absent in isolated human hepatocytes. HepG2 cells incubated overnight with CD47 mAbs did not induce cell death. Phagocytosis of HCC cells was significantly increased by the blocking CD47mAb 400 compared to control mAbs ($p < 0.05$). The phagocytic index of the anti-CD47400 was 71.1 ± 1.08 whereas for the IgG it was 11.5 ± 0.36 and for 2D3 was 9.6 ± 0.61 .

Conclusions: CD47 is highly expressed in primary HCC tumors and on HepG2 cells but not in normal hepatic tissue. Blockade of CD47 markedly increased macrophage phagocytosis of HCC cells suggesting that blockade of CD47 may be beneficial in the management of HCC.

PO29-01

MINIMALLY INVASIVE RAMPS IN WELL-SELECTED LEFT-SIDED PANCREATIC CANCER WITH YONSEI CRITERIA: LONG-TERM (>MEDIAN 3 YEARS) ONCOLOGIC OUTCOME

Sung Hwan Lee, Chang Moo Kang, Ho Kyoung Hwang, Sung Hoon Choi and Woo Jung Lee
Yonsei University College of Medicine, Korea

Introduction: Though minimally invasive techniques for distal pancreatectomy with or without splenectomy have been regarded as a feasible and safe treatment for benign and borderline malignant lesions of pancreas, it is still debatable in management of left-sided pancreatic cancer in terms of feasibility and oncologic safety.

Method: From June 2007 to November 2010, 12 patients underwent laparoscopic or robotic radical antegrade modular pancreatosplenectomy (RAMPS) for well-selected left-side pancreatic cancer. Yonsei criteria for selecting patients included following tumor condition; pancreas-confined tumor, intact fascia layer between the distal pancreas and left adrenal gland and kidney, tumor apart more than 1 or 2 cm from celiac axis. We compared the clinicopathologic factors and oncologic outcomes of minimally invasive surgery (MIS) group and open group for treating left-sided pancreatic cancer.

Results: In MIS group, mean of tumor size was 2.75 ± 1.32 cm and retrieved lymph nodes were 10.5 ± 7.14 . The resection margins were confirmed to negative for malignancy in all patients. In comparison with open group ($n = 24$), there were statistically significant factors in terms of tumor size (2.75 ± 1.32 vs. 3.93 ± 1.50 cm, $p = 0.028$), hospital stay (12.25 ± 6.79 vs. 21.83 ± 13.76 days, $p = 0.008$). In survival analysis, MIS group had better overall survival (OS) periods than the open group (60.0 vs. 30.7 months, $p = 0.046$). In order to overcome the heterogeneity of subject between the MIS and open group, we divided the open group into two groups depending on Yonsei criteria. There were no significant difference of median overall survival periods between the MIS group and the open group within Yonsei Criteria (60.00 vs. 60.72 months, $p = 0.495$).

Conclusions: Minimally invasive RAMPS is not only technically feasible but also oncologically safe in well selected left-sided pancreatic cancer. Yonsei Criteria for selecting minimally approach need to be validated based on large volume experiences.

PO29-02

USEFULNESS OF LOW POWER CUSA IN LAPAROSCOPIC ENUCLEATION OF PANCREATIC TUMOR LOCATED CLOSE TO THE MAIN PANCREATIC DUCT

Masahiro Minagawa, Kazuyasu Takizawa, Masakazu Nitta, Kabuto Takano, Jun Sakata, Takashi Kobayashi and Toshifumi Wakai

Niigata University Graduate School of Medical and Dental Sciences, Japan

Introduction: Injury of the main pancreatic duct (MPD) is problematic in pure laparoscopic enucleation of pancreatic tumor close to the MPD as well as open surgery. In order to avoid MPD injury in laparoscopic enucleation, our group has been testing to use minimal-powered CUSA (Cavitron Ultrasonic Surgical Aspirator) which enables to expose peripheral vessels without bleeding. We herein introduce our technique and show the results so far.

Method: The power setting of CUSA was reduced to the minimal level before use. The surface of the pancreas was transected using laparoscopic coagulating shears (LCS). Low power CUSA was used in dissection of the deep part of the pancreas near the MPD. To confirm no leakage from the MPD, indigo carmine injection from endoscopic naso-pancreatic tube inserted preoperatively was performed after tumor removal. Three of 6 patients who had a pancreatic tumor (5 insulinomas and 1 nonfunctional neuroendocrine tumor) located within 3 mm from the MPD underwent pure laparoscopic enucleation by this procedure. Several clinical data were compared between three cases using CUSA (CUSA group) and the other three cases not using CUSA (no CUSA group).

Results: There was no injury of the main pancreatic duct in all cases. Although the amount of bleeding showed no significant difference between two groups, the average of the time required to manage hemostasis was shorter in CUSA group than no CUSA group (166 ± 70 seconds vs. 646 ± 382 seconds). The mean operation time was 328 ± 54 min. in CUSA group and 238 ± 74 min. in no CUSA group respectively. Pancreatic fistula (ISGPF Grade B) occurred in 1 patient.

Conclusions: Gentle dissection using low power CUSA can keep a dry operative field during enucleation of pancreatic tumor. This technique may become one of useful procedures for laparoscopic pancreas surgery.

PO29-03

SHOULD WE BE RELUCTANT TO PERFORM PANCREATODUODENECTOMY IN PATIENTS WITH LIVER CIRRHOSIS?

Young-dong Yu, Dong-Sik Kim, Sung-Won Jung and Sung-Ock Suh

Korea University Anam Hospital, Korea

Introduction: Despite recent advances in surgical procedures and postoperative management, pancreaticoduodenectomy (PD) still implies mortality and high morbidity rate. Liver cirrhosis with or without portal hypertension has been found to be a major risk factor for intra-operative bleeding and postoperative ascites following extra-hepatic surgery. The high mortality rate of elective extra-hepatic surgery in cirrhotic patients with portal hypertension leads some surgeons to consider liver cirrhosis a contraindication for PD. The aim of this study was to present our results of PD in cirrhotic patients.

Method: We retrospectively reviewed the medical records of patients who underwent pancreaticoduoden-

ectomy from January 2002 to December 2012. Patient data and clinical outcomes were collected and entered into a database. Patients with preoperative liver cirrhosis were compared with patients without liver cirrhosis.

Results: There were 133 patients who received pancreaticoduodenectomy. Among these patients, 18 patients were diagnosed with liver cirrhosis preoperatively. Liver cirrhosis was due to hepatitis B ($n = 8$), hepatitis C ($n = 1$), alcohol ($n = 5$) but was also cryptogenic ($n = 4$). Most patients were child A with only one patient child B. The mean MELD score was 4. The morbidity rate was 22.2% and the immediate postoperative mortality rate was 11.1%. There was no significant difference in operation time, blood loss, hospital days and postoperative outcome between the cirrhosis group and non-cirrhosis group.

Conclusions: We believe that PD can be safely performed in patients with Child A liver cirrhosis and should not be systematically considered as a contraindication.

PO29-04

POSTOPERATIVE BETA CELL FUNCTIONS CORRELATE WITH THE REMNANT PANCREATIC VOLUME AFTER MAJOR PANCREATIC RESECTION

Kenichiro Uemura, Tuguka Shiwa, Yoshiaki Murakami, Takeshi Sudo, Yasushi Hashimoto, Naru Kondo, Kazuhiro Kobuke, Masayasu Yoneda and Shuhei Nakanishi

Graduate School of Biomedical and Health Sciences, Hiroshima University, Hiroshima, Japan

Introduction: There is few data concerning the beta cell function after major pancreatic resection. The aim of this study was to clarify beta cell function and the pathogenesis of postoperative DM after major pancreatectomy using glucagon stimulation test (GST), and the correlation between beta cell function and pancreatic parenchyma volume (PV).

Method: A total of 52 patients who underwent major pancreatic resections, 33 patients with pancreaticoduodenectomy (PD) and 19 patients with distal pancreatectomy (DP) were enrolled. The beta cell functions were evaluated by GST before and after surgery. Fasting serum C-peptide levels (F-CPR) and stimulated serum C-peptide values (6 min.-CPR) were used to assess the beta cell function. The PVs were measured with 64-row multi-detector computed tomography.

Results: Median values of F-CPR and 6 min.-CPR significantly decreased after pancreatectomy (F-CPR: 1.8 vs. 1.5 ng/mL, $p < 0.001$, 6 min.-CPR: 4.5 vs. 2.7 ng/mL, $p < 0.001$). Median value of PV was also significantly decreased after pancreatectomy (49.7 vs. 19.5 cm³, $p < 0.001$). In the patients after DP, the values of HbA1c (6.3 vs. 5.5%, $p < 0.05$), fasting plasma glucose levels (129 vs. 109 mg/dL, $p < 0.01$), and the incidence of DM (67% vs. 33%, $p < 0.05$) are significantly higher than that after PD, while, postoperative 6 min.-CPR levels (3.25 vs. 2.55 ng/mL, $p < 0.05$) and postoperative PV (30.8 vs. 16.8 cm³, $p < 0.05$) in the patients after DP, are significantly higher than those

after PD. Both basic and stimulated serum CPR levels in the postoperative period were significantly correlated with postoperative PVs (F-CPR: $r = 0.509$, $p < 0.001$, 6 min.-CPR: $r = 0.641$, $p < 0.001$).

Conclusions: The incidence of postoperative DM is significantly higher in the patients with DP than that after PD, in spite of the significantly better beta-cell function. Postoperative beta cell functions correlate with the remnant pancreatic parenchymal volume after major pancreatic resection.

PO29-05

TOTAL PANCREATECTOMY FOR PANCREATIC NEOPLASMS

Shuji Suzuki, Takashi Hatori, Akira Kimijima, Nana Oshima, Ryuji Suzuki, Wataru Izumo and Masakazu Yamamoto

Tokyo Women's Medical University, Japan

Introduction: Total pancreatectomy (TP) is sometimes performed to treat pancreatic neoplasms that are spreading to the entire pancreas. However, TP impairs quality of life, due to the resulting loss of pancreatic exocrine and endocrine function. However, the outcome after TP is improved so much recently. We analyzed postoperative early and late outcomes after TP.

Method: A total of 79 patients who underwent TP including total excision of the remnant pancreas (TERP) for the pancreatic neoplasms from 2000 to 2012 were examined retrospectively. Clinicopathological background, morbidity, and survival data were collected and analyzed.

Results: 43 patients were male and 36 patients were female. The mean age was 66.5 years (range, 47–83 years). There were 50 patients with intraductal papillary mucinous neoplasm (IPMN), 22 patients with pancreatic ductal adenocarcinoma (PDAC), 4 patients with multiple pancreatic metastases from renal cell carcinoma, two patients with intraductal tubulopapillary neoplasm (ITPN) and two patients with multifocal PanIN-3. 62 patients underwent primary TP and 17 patients underwent TERP. Only four patients underwent conventional TP and remaining 75 patients underwent organ-preserving TP (pylorus preserving TP (PPTP) 51, subtotal stomach-preserving TP (SSPTP) 12, duodenum-preserving TP (DPTP) 11). Mortality rate was 0%, and morbidity rate was 12% (10). Morbidity consisted of five patients with delayed gastric emptying, three patients with lymphatic leak, 1 patient with bile duct stenosis, and one patient with ileus. Only a patient was received of re-operation for ileus. They needed to use insulin from 14 to 48 units. They controlled HbA1c level from 6.1 to 8.6%. Megadose pancreatic enzyme replacement therapy was required in all patients. Complete rehabilitation was achieved in 76 patients (96%).

Conclusions: TP, especially organ-preserving TP is feasible to treat pancreatic neoplasms that are spreading to the entire pancreas.

PO30-01

CO-TRANSPLANTATION WITH BONE MARROW DERIVED MSCS IN THE INTRAMUSCULAR ISLET TRANSPLANTATION

Gumpei Yoshimatsu¹, Naoaki Sakata¹, Haruyuki Tsuchiya¹, Masahiko Fukase¹, Tatsuo Hata¹, Yu Katayose², Shinichi Egawa³ and Michiaki Unno¹
¹Tohoku University Graduate School of Medicine, Japan; ²Tohoku University Hospital, Japan; ³Tohoku University, Japan

Introduction: Intramuscular islet transplantation is considered as safe and easy in procedure, however the transplant efficiency was worse than intraportal transplantation which has been performed in clinical. Mesenchymal stem cells (MSCs) have many useful roles for cotransplanted cells such as preventing apoptosis and inflammation and promoting neovascularization. We attempted to improve the efficiency of intramuscular transplantation by cotransplantation of bone marrow derived MSCs using the rodent model.

Method: Islets and MSCs were acquired from BALB/c mice (9-12w, male). *In vitro* study, we performed culture of islets (50 islet equivalents) with and without MSCs (1×10^5 cells) for 96 hs, and evaluated the residual rate of islets (ratio of residual islet numbers and islet numbers at 0 h), viability of islets (ratio of viable cells and total cells in islet) and insulin releasing function (ratio of released insulin volume at high and low concentration of glucose stimulations: stimulation index). *In vivo* study, we performed syngeneic intramuscular islet (500 islet equivalents) with and without MSC (5×10^5 cells) cotransplantation to diabetic mice and evaluated blood glucose levels, plasma C-peptide, body weight, and change of blood glucose level after glucose stimulation (glucose tolerance test).

Results: While there was no significant difference in residual rate, stimulation index was significantly higher in islets with MSCs group. Blood glucose level of islets with MSCs group tended to be lower than islet without MSCs group. In the glucose tolerance test at 1 month after transplantation, the pattern of blood glucose change was better in islets with MSCs group, especially at the 90 and 120 min. after glucose stimulation.

Conclusions: Co-transplanted of MSCs can improve the islet graft function and glucose tolerance in intramuscular transplantation.

PO30-02

PANCREAS TRANSPLANT AT TAIPEI VETERANS GENERAL HOSPITAL

Yi-Ming Shyr and Shin-E Wang

Taipei Veterans General Hospital, Taiwan

Introduction: Type 1 diabetes eventually leads to nephropathy, neuropathy, retinopathy and angiopathy after 10–30 years. Currently, pancreas transplant is the treatment of choice in tight control of blood sugar for IDDM patients, and further to stabilize, prevent or even to reverse the diabetic complications. We will present our experience in pancreas transplant which was initiated on September 19, 2003.

Method: From September 2003 to December 2012, there were 79 pancreas transplants performed for 75 patients at Taipei Veterans General Hospital, with 29 SPK, 8 PAK, 37 PTA and 5 PBK.

Results: Most (82.3%) of our pancreas transplants were for IDDM patients. The blood sugar usually returned to normal level within 5 hours (median) after revascularization of the pancreas grafts. The fasting blood sugar maintained within normal range thereafter throughout the whole clinical course in most cases. There were two surgical mortality. The technical success rate was 94.9%. Excluding the four cases with technique failure, overall 1-year pancreas graft survival is 98.5% and 5-year is 94.1%, with 100% 1-year for SPK, 97.1% 1-year for PTA, 100% 1-year for PAK and 100% 1-year for PBK.

Conclusions: Pancreas transplant provided an ideal insulin-free solution for DM, especially IDDM. Pancreas transplant could be performed with similar successful rate irrespective of the type of pancreas transplant at our hospital.

PO30-03

EFFECT OF EARLY ENTERAL NUTRITION ON POSTOPERATIVE NUTRITIONAL STATUS AND IMMUNE FUNCTION FOLLOWING PANCREATICODUODENECTOMY

Hitoshi Inoue, Jota Watanabe, Takaaki Takebayashi, Tetsuya Mizumoto, Hajime Sato, Syoichi Kageyama, Akihiro Takai, Taiji Tohyana, Fumiki Kushihata and Yasutugu Takada

Ehime University, Japan

Introduction: To explore the effect of early enteral nutrition (EN) on postoperative nutritional status, intestinal permeability, and immune function in patients following pancreaticoduodenectomy.

Method: Total of 34 patients with malignant tumor who underwent pancreaticoduodenectomy in our hospital from April 2011 to May 2013 were enrolled in this study. They were prospectively divided into EN group (n = 15) and total parenteral nutrition (TPN) group (n = 16) based on the nutrition support modes. The body weight, average hospital stay, complications and mortality after the surgery were recorded and analyzed. Peripheral blood samples were collected on the days 1, 3, 5, 7 and 14 after surgery. The plasma diamine oxidase (DAO) activity was determined to assess the intestinal permeability. The postoperative blood levels of inflammatory cytokines were determined using enzyme-linked immunosorbent assay (ELISA).

Results: After the surgery, complications were less in the EN group than those in the TPN group. The DAO activity were significantly higher in the EN group than those in the TPN group on POD 5 and 14 (all $p < 0.05$). In addition, the EN group had higher IL-10 levels than the TPN group.

Conclusions: Early EN after surgery can effectively improve the postoperative course, protect intestinal mucosal barrier.

PO30-04

IMPAIRED PANCREATIC PERFUSION IN SPLENIC VEIN THROMBOSIS FOLLOWING LAPAROSCOPIC SPLENECTOMY

Sung Hwan Lee, Chang Moo Kang, Yong Eun Chung, Ho Kyoung Hwan, Sung Hoon Choi and Woo Jung Lee

Yonsei University College of Medicine, Korea

Introduction: Despite of significant incidence of splenic vein thrombosis after laparoscopic splenectomy, there are few researches about the clinical significance of splenic vein thrombosis (SVT) following laparoscopic splenectomy. Especially, the relationship between SVT and pancreatic perfusion has never been reported.

Method: We retrospectively analyzed the record of patients who underwent laparoscopic splenectomy from August 2006 to August 2011. Patients who were performed abdominal CT scan before and after laparoscopic splenectomy were enrolled in this study. We measured the Hounsfield scale (HU) of each part of pancreas divided into three parts (Head, Body and Tail), and then analyzed the difference between preoperative values and postoperative values, SVT group and no-SVT group.

Results: Thirty-four patients were enrolled in this study, and 21 patients (61.8%) were found to have SVT in remnant splenic vein after laparoscopic splenectomy. In comparison of pancreatic perfusion between preoperative and postoperative phase, significant reduction of Hounsfield scale was observed in late arterial phase of CT scan regardless of location (Tail: 107.56 ± 14.53 vs. 94.33 ± 16.99 , p -value = 0.000 & Body: 109.17 ± 16.59 vs. 100.40 ± 16.19 , p -value = 0.002 & Head: 107.67 ± 17.49 vs. 101.62 ± 13.77 , p -value = 0.026). In comparison of postoperative pancreas perfusion between SVT and no-SVT group, significant difference was noted at tail portion in late arterial phase (89.58 ± 17.25 vs. 101.98 ± 13.94 , p -value = 0.037).

Conclusions: Impaired pancreatic perfusion was observed postoperatively in each parts of pancreas at late arterial phase of CT scan. Especially, significantly reduced perfusion of distal part of pancreas was observed in SVT group after laparoscopic splenectomy compared with non-SVT group. Well-designed prospective study is necessary to assess the clinical impact of impaired pancreatic perfusion on development of postoperative pancreatic fistula in laparoscopic distal pancreatectomy.

PO30-05

EARLY ENDOSCOPIC CYSTOGASTROSTOMY IN GRADE III PANCREATIC TRAUMA TREATED INITIALLY WITH NON-OPERATIVE MANAGEMENT – IS IT SAFE?

Vasu Pillai Letchumanan and Manisekar Subramaniam
Hospital Sultanah Bahiyah, Alor Star, Malaysia

Introduction: In pancreatic trauma, integrity of the main pancreatic duct is the most important factor in

determining the outcome of patients. Severe pancreatic injury is mainly managed with surgical intervention.

This case series describes successful initial non-operative management of Grade III pancreatic injury followed by endoscopic cystogastrostomy within 3 weeks post trauma.

Method: Ten patients who had Grade III pancreatic trauma were managed with non-operative management from August 2010 till August 2013. Repeat CT scan done at 2 weeks post trauma. If pseudocyst identified, endoscopic cystogastrostomy was done as early less than 3 weeks under general anaesthesia or sedation. Using ERCP scope, needle knife was used to puncture the selected point. D-J stents were inserted draining the fluid. The stents were removed one month post procedure after reassessed with imaging during follow up.

Results: The patients presented within 1 to 27 days post trauma. 90% of the patients noted to have thrombocytosis before the procedure. In our series of 10 patients, 8 of the patients underwent endoscopic cys-

togastrostomy; one underwent percutaneous drainage of pseudocyst and one patient noted to have spontaneous resolution of pseudocyst. Four of the patients underwent endoscopic cystogastrostomy within 3 weeks post trauma. Among the endoscopic cystogastrostomy patients, there was one failure; one patient needed 2nd endoscopic cystogastrostomy and another patient underwent percutaneous drainage and subsequently retroperitoneal necrosectomy for another collection. Two patients noted to have residual pseudocyst (3 cm) on follow up but they were asymptomatic. No immediate post procedure complications. There was no mortality recorded.

Conclusions: Non operative management of severe pancreatic injury with early endoscopic cystogastrostomy is feasible and yields good results with low morbidity. It preserves the pancreas. Early endoscopic cystogastrostomy, within 3 weeks in pancreatic pseudocyst is safe. However, long term follow up required looking for long term morbidity.